OCTOBER FOOD TECHNOLOGY

PACKAGING

Comparing Foil with Other Wrappers for Cheese 101
New Method of Packaging Sliced Loaves. 101

FOOD TECHNOLOGY

Curing Vanilla 101
Acetaldehyde in Red Wines..... 101
Methyl Bromide Retention in Foods..... 101
Influence of Addition of Sugar to Brines in Pickle Fermentation..... 54
Four Basic Factors in Detergency..... 48

VITAMINS

Fish Liver and Body Oils..... 102
Vitamin C in Sauerkraut..... 102

MEAT

Pork Improves Corned Beef..... 102

FROZEN FOODS

Foods Suitable for Freezing..... 102
New Quick Freezer Tests Foods in South. 46

ENGINEERING

Compressed Air Replaces Dusting Flour. 103
Electrical Refrigeration Equipment..... 103
Economic Operation of Batch Extractors.. 43

FATS AND OILS

Continuous Refining of Fatty Oils..... 104

DAIRY PRODUCTS

Coli in Ice Cream Mix..... 104
Rancidity Reproduced in Cheddar Cheese 104

MISCELLANEOUS

Minerals in Nutrition..... 105
Photochemical Oxidation of Fats..... 105
Brief Summaries of AMS Standards..... 59

QUALITY CONTROL

What You Can Do With Colloidal Stabilizers 57
Testing Paprika by Color Comparison.... 61

THE COVER

One of the many plants which bottle Coca-Cola is shown on the cover and illustrated above. This particular plant is noteworthy because it was adjudged by the Jury of Architectural Awards of the Baltimore Association of Commerce to be the outstanding factory completed in that city during 1939. Exterior design, suitability to use, practical and artistic utilization of materials and adaptability to site and neighborhood were bases of the award. These attributes mean much in local good will.

FOOD INDUSTRIES

M. A. WILLIAMSON, *Publisher* — LAURENCE V. BURTON, *Editor*

E. S. STATELER, *Associate Editor, Chicago* — G. L. MONTGOMERY, *Associate Editor*

F. K. LAWLER, *Managing Editor* — ELIZABETH B. SHAW, *Editorial Assistant*

R. S. McBride, Washington, D. C. — S. T. Henry, Spruce Pine, N. C.

Paul Wooton, Washington, D. C. — Earle Mauldin, Atlanta, Ga.

N. A. Bowers, San Francisco, Cal.

VOL. 13 No. 10 — OCTOBER, 1941

SPECIAL FEATURE

Putting False Faces on Formulas.....*By W. R. Van Meter* 41

ENGINEERING

Economic Operation of Batch Extractors
By W. L. Faith, W. S. Peterson and Morton Smutz 43

PRODUCTION

New Quick Freezer Tests Foods in South...*By Earle Mauldin* 46

Four Basic Factors in Detergency.....*By Foster Dee Snell* 48

Too Many Accidents in Food Plants..... 50

QUALITY CONTROL

Deleading Maple Sirup by Clarification
By C. J. Tressler and W. I. Zimmerman 52

Influence of Addition of Sugar to Brines in Pickle Fermentation—Part I....*By M. K. Veldhuis, J. L. Etchells, I. D. Jones and Otto Veerhoff* 54

What You Can Do With Colloidal Stabilizers—Part II
By W. C. Cole 57

Brief Summaries of AMS Standards..... 59

Testing Paprika by Color Comparison...*By C. W. Neusbaum* 61

MATERIALS

Shorts on Shortages..... 63

MARKETS

Air Line Must Buy Top-Flight Foods.....*By Mildred Inwood* 64

MANAGEMENT

Tank Trailers Haul Feed and Cut Costs in Half..... 66

What Your Chemist Can Do for You...*By Waldemar Dasler* 68

"Soda Fountain" Truck Speeds Delivery..... 70

EVERY MONTH

Talk of the Industry..... 37
Automotive 66, 70
The Food Industry News..... 73
Business Trends 82
Men, Jobs and Companies..... 87
New Packages and Products..... 91
Food Equipment News..... 95
Catalogs 99
Food Technology—Abstracts..... 101
Books 106
Patents 107
Formulas 111

This Issue

How Red Is Red

Paprika is often used in foods for the attractive red color that it imparts. But, unfortunately, visual inspection does not tell what this color will be. So C. W. Neusbaum has developed a simple and rapid color comparison test for paprika, useful also in determining the quality of other red foods such as tomato products, chili and red peppers and carrots—page 61. The author has been chemist and bakery superintendent of Lake Side Biscuit Co., and, for the past nine years, chief chemist of Vincennes Packing Corp.

Hide It Under Confusion

The formula for any food product that people like is a valuable piece of property. And as such it must be kept a secret, even from workers in your own plant. And by formula we mean not only ingredients but methods of processing—temperatures, pressures and what not.

Now you can't keep a valuable formula locked up in a safe, or it ceases to be valuable. You have to keep it in production. So what to do? Well, right now the best thing is to turn to page 41 and get some pointers from W. R. Van Meter of Kingston (Pa.) Cake Co. He tells you how to protect a formula by using arbitrary units of measurement and other tricks.

Know Your Chemist Better

Any food manufacturer who thinks his chemist spends his time just testing things is not getting his money's worth out of his laboratory. And any manufacturer who does not take laboratory reports seriously is robbing himself. A laboratory is a service department. It can do everything from improving products to cutting production costs. Take your problems to it. Cooperate with your chemist—and you'll be surprised. But turn to page 68 and let Waldemar Dasler, research chemist at Nutrition Research Laboratories, Chicago, tell you how to get the most out of your chemist.

A, B, C's of Detergency

Keeping equipment and containers really clean is largely a matter of choice of suitable cleansers. And this choice must be based upon four factors of detergency—factors that have been determined by the careful work of chemists. What these factors are and how various detergents compare as to these factors is told on page 48 by Foster Dee Snell, well-known consulting chemist and engineer, widely experienced in food technology.

Coming

Controlling Vinegar

Ordinary laboratory control methods do not accurately reflect the behavior of large-scale generators used in the so-called quick vinegar process for the production of acetic acid. To overcome this difficulty and provide an experimental vinegar generator for small-scale tests and control work, one large producer has developed laboratory apparatus by means of which vinegar can be produced by the quick vinegar method. How this apparatus is built and the results that it gives will be outlined in a forthcoming article.

pH is What?

As food processing becomes more and more subject to scientific control, words and phrases tend to migrate from the laboratory and enter the daily language of the plant. Sometimes, as a result, such technicalities must be used by the plant man with understanding, if he and his laboratory are to understand each other.

One of these expressions most frequently encountered is "pH." People bandy around talk of the pH of this or that and, at times, it is not clear just what they mean. So FOOD INDUSTRIES will publish an article telling just what it is—and why. This will be followed by another article on pH determination and measurement.

You May Be Sued

Time was when the consumer had no right of action for damage against the food canner or packer for injuries sustained because of deleterious material. But times have changed, and so has the law. Courts have established that the packer is held to represent to each purchaser that the contents of his packages are wholesome and are suitable for the purpose for which they are sold. The extent of the manufacturer's liability for defective products will be explained in an early issue by Alexander Schamban, Philadelphia attorney whose experience has qualified him to speak with authority.

Unhorsing the Stooge

A. M. Zenzes effectively pleaded the case of the technical stooge versus the order-taking salesman in the August issue. Now comes the other side of the situation. In a future article, "The Order-Taker Talks Back," an order-taker will take the technical stooge apart and show you what makes him tick—and sometimes skip a couple of ticks. If Mr. Zenzes aroused either your pleasure or your ire, you will find this rebuttal by the order taker either informative or appeasing, or both.

McGraw-Hill Publishing Company, Inc., James H. McGraw, Founder and Honorary Chairman. Publication Office: 99-129 North Broadway, Albany, N. Y., Editorial and Executive Offices: 330 West 42nd Street, New York.

Branch Offices: 520 North Michigan Ave., Chicago; 68 Post St., San Francisco; Aldwych House, Aldwych, London, W.C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

JAMES H. McGRAW, Jr., President; HOWARD EHRLICH, Executive Vice-President; MASON BRITTON, Vice-Chairman; B. R. PUTNAM, Treasurer; DONALD C. McGRAW, Secretary and J. E. BLACKBURN, Jr., Director of Circulation.

A McGRAW-HILL PUBLICATION

Published monthly; price 35c a copy. Allow at least ten days for a change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York, N. Y. Subscription rates: United States and possessions, Mexico, Central and South American countries, $3 a year, $4 for two years, $5 for three years. Canada, $3.50 a year; $5 for two years; $6 for three years (payable in Canadian or U. S. funds). Great Britain and British possessions, 30 shillings for one year, 60 shillings for three years. All other countries, $5 a year, $10 for three years. Entered as second-class matter Aug. 17, 1936, at Post Office, Albany, N. Y., under the act of March 3, 1879. Cable address: "McGrawhill, N. Y." Member of A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index. Copyright, 1941 by McGraw-Hill Publishing Company, Inc.

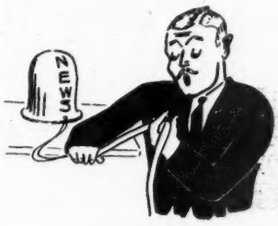
FOOD INDUSTRIES
FOR THOSE WHO CONTROL QUALITY
THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor OCTOBER, 1941

The Talk of the Industry

● If you should ever wish to see a very small exclusive group of men you can see them in the National Press Club in Washington where a small table in the dining room is known as the "Axis Table." Exclusive is hardly the right word. Outcast would be more like it.

● "Katy did, and Katy didn't" was the laconic comment of a veteran market reporter as he watched the news ticker grinding out the story of the recent OPACS order pertaining



to futures trading in oils and fats. The order and its immediately ensuing "explanations" had many of the earmarks of juvenile understanding of the technics of business.

Though it was seemingly designed to prevent the possibility of speculative hoarding of fats and oils, it had the effect of suspending trading for a time.

● Vitamin lore is extending in many directions, the latest field to become vitamin conscious being the pickle industry. Professor F. W. Fabian of Michigan State College has recently informally advised the National Pickle Packers Association that there is a real, and not merely an apparent, increase in the vitamin A content of brine pickles during salting and curing. This finding is being hailed as the basis for a membership drive and a publicity campaign.

Though we believe every member of an industry ought to belong to a trade association, and though we wish the association good luck in its effort to bring out more stable conditions in the pickle trade, it appears to us that a slight increase of vitamin A in brine pickles is a rather diminutive rallying point.

While information given out by the association relates only to brine stock, it is unlikely that as capable an investigator as Professor Fabian will end his researches without including finished pickles, which are in a slightly more palatable stage of preparation.

● Dehydrated soups are receiving much attention from the ladies who edit the food columns in daily papers. Some of the soups are of superlative quality. As it looks from where we sit, their consumer acceptance lies, not in the fact that they are dehydrated, but in the fact that they are often of excellent and unusual flavor. If further experience reveals that this flavor novelty is indissolublely tied up with dehydration as a method of preservation (most of us know too little about the effects of methods of preservation on the flavors of pot herbs), then the future of the soup business may be expected to undergo obvious changes. Scarcity of some of the essential raw materials will, even in peace time, however, act as a brake on any phenomenal changes. Change is always the order of the day, but here is one case where change must perforce be limited to the availability of the raw materials.

● Canned beer is becoming a military necessity for desert warfare. And large shipments are going to Egypt and other points where military action is taking place in countries where good drinking water is almost impossible to obtain. Apparently, no country other than the United States is canning beer. Which makes a pleasing prospect for brewers, who normally experience a marked seasonal decline in beer consumption with the advent of cooler weather.

Another interesting factor in this new market for food in liquid form is the fact that British troops have appeared to like their beer warm—something that does not appeal to North Americans. Perhaps this is making a virtue of necessity, for when

one is famished the desire for water is so great that anything wet will do. Nevertheless, one wonders how much beer is lost when Tommy Atkins opens a can that has been bounced

around at desert temperatures, usually above 100 deg. F.

Government Aids to Tin Plate Conservation

Recent figures issued by the government show the U. S. Army is now beginning to buy huge quantities of dehydrated vegetables. Important recent figures show that purchases cover dehydrated potatoes to the extent of $36,000, dehydrated carrots worth $15,582, dehydrated cabbage to the amount of $179,000 and dehydrated soup mixes to the value of $85,235. In addition to this, the Army has recently purchased "soup mix, paste" worth $33,705.75. The entire series of orders totals $349,522.75 and is scheduled for delivery Nov. 11, 1941.

The amount of raw materials required for these orders is probably more than 30,000 tons. If packed loose in containers, the dehydrated material will require something like 500,000 cu. ft. of container capacity to package it.

Army's interest in dehydration is an effort to conserve tin plate. While dehydrated vegetables lose more than 80 percent of their natural weight, their volume shrinks only about 50 percent. But because they do not require sterilization by heat, dehydrated vegetables can be packed in suitable moisture-tight containers of any convenient size. If the container holding 25 lb. of dry material is used, it will effect a very appreciable conservation of tin plate over the same amount of raw material packed in No. 10 cans by the usual canning methods. Without any further data than the dollar values given out by the government, it would appear that the conservation of tin plate area by use of dehydration would amount to about 40 percent.

Reversal of Policy

No more radical reversal of government policy has been announced lately than the September publication of Secretary of Agriculture Wickard, seeking increased agricultural production. Expansion of production of the following commodities is sought: Hogs, eggs, evaporated milk, dry skim milk, cheese and chickens. And that is only the beginning.

America has got to be a food reservoir as well as an arsenal for much of the rest of the world. Sooner or later our feeding of folks will extend beyond the democracies. It will include conquered areas. It may ultimately include areas of former enemy countries.

Food manufacturers as well as farm producers of food raw materials have a tremendous load to carry. Large scale expansion is essential in factories as well as on farms.

This is no time for small-scale thinking. But it is also no time for careless production planning with wild exaggerated guesses as to what can be sold. There is no simple answer. Each engineer and executive of food manufacture has got to do a lot of serious studying on his own company's problems.

Salvage Business Due for Upswing

Unless we are very much mistaken, it appears likely that wholesale salvage of domestic waste materials will be undertaken within the next year or two. Materials to be saved and segregated for the collector will probably include paper in all forms, bones, bottles, metals, rags and fats.

No great amount of foresight is needed to visualize that aid to the victims of aggression, including the millions of Russians who have been driven from the most fertile part of their land, will place enormous demands on the food producing resources of the Western Hemisphere. In order to meet these demands, it

Hors d'Oeuvres

• *Doughnut sales were no less than $81,000,000 in 1940. Big business in the hole!*

• Charlemagne was famous as a brewer, personally directing the making of beer for his court. Hitler, too, is a famous brewer, having brewed more trouble than anybody. He's also a great butcher. He ought to join the IFT.

• *Forty years ago Albert E. Heekin was general manager, sales manager, only salesman and office boy of Heekin Can Co. As office boy he must have made a good impression on the general manager, for he rose to the presidency.*

• The Army has replaced the ounce of chocolate in the Type C field ration with five pieces of hard candy, individually wrapped and in assorted flavors. Note to Adolf: Don't try to take candy from the kid in khaki.

• *The Japanese each eat 100 lb. of fish a year. Didn't some one once make the observation that you are what you eat?*

• According to recent findings, vitamin C promises to be useful in postponing the effects generally associated with senescence in man. Which makes orange juice good for a pick-up.

• *Department of Commerce figures show that 118,896 goats were milked on 33,232 farms in 1940, and no kidding—except on the part of the goats.*

• To feed the 12,000,000 people in the greater New York area requires 40,000,000 lb. of food a day. Which makes the food supply for the Army look like an appetizer on a reducing diet.

• *The Society of Amateur Chefs is switching from the preparation of exotic dishes to those that fit into a sound diet. My, my! Such a commonplace program.*

• In its issue of April 10, 1909, "The Lancet," British medical journal, reported that, because of yeast fermentation, hot-cross buns contained 7.2 grains of alcohol. So that's where they got the expression, "getting a bun on"!

• *America will manufacture more food products this year than any nation has ever produced in the history of the world. And more people will go hungry in Europe this winter than ever before in history. Isn't Adolf's New Order a wonderful thing?*

• With supplies of olive oil short and prices high, various enterprising gentlemen are offering olive oil packers the usual extract which gives the taste and aroma of olive oil to any seed oil. Economic storms, too, bring worms to the surface.

• *The carbonated beverage industry is suggesting that home makers improve their household efficiency with a morning and afternoon pick-up of soda pop. For years Coca-Cola has put it more subtlely as "The Pause That Refreshes."*

• Oystermen are being trained by the Coast Guard and Navy as spotters and sweepers of mines and observers of inshore shipping. Not only is American food being used to win this war but food men are preparing to help fight it.

• *Rheology is the science of flow and deformation of matter, which they say is important in the manufacture of cheese. Apparently a rheologist is the guy that puts the holes into cheeses.*

F. K. L.

is likely that salvage operations will be greatly needed. The amount of food needed for export will be limited only by the number of ships available for transportation overseas.

Defense Problems Vex Food Industry

Priority controls are making it more difficult for non-defense industries to get raw material or equipment that is needed, and everywhere the advance dope is that scarcity problems are still a long way from their peak. Bearing in mind the potential horrible cost to the citizens of the United States of a military defeat either to the opponents of aggression, or to ourselves, we must be as philosophical as we can. It is far cheaper to pay the cost now *and win* than to pay later the cost of defeat of democracy as a way of life.

OPM Going After Hoarders

But even if we are philosophical about the current problems of scarcity, that need not close our eyes to what is going on nor prevent us from protesting violently over current events.

Any astute person can detect the underlying causes for certain moves by OPM to ascertain the size of physical inventories of urgently needed materials held by industry. Is it necessary to tell anyone that OPM *knows* there is hoarding of these scarce materials and is determined to ferret out both the materials and the offenders?

Canadian View of Nickel

A responsible Canadian official recently expressed himself in these words:

"The great mystery of the age is: What has become of all the nickel that Canada has produced? We know the amount we produced, we know our exports, we know what we sent to the U. S. and we have a pretty good knowledge of how much of it has been re-exported or manufactured in your country.

"But when we try to strike a balance of the figures we can't even come close. Our only explanation is that there must be some handsome inventories somewhere in the United States.

"If that occurred in Canada we could do something about it. But we Canadians can't go into the United States and bring it to light. We feel that our current rates of production, soon to be augmented, will be ample for all needs, if these undisclosed inventories could be utilized."

2 x 2 = 111

OPM has many unusually capable and gifted men in its organization who are wise in the ways of mankind. As one of them summed up the situation:

"The whole problem of supply and demand, and also of priority ratings, would be easy if business men would read the forms of application, be honest and play the game fairly, and *learn how to multiply*. Ninety percent of our problems today arise from the inability of many manufacturers to multiply correctly. There are too many instances of $2 \times 2 = 111$.

"I can show you cases where the fellow who makes up the material specification for a given contract has multiplied the correct amount by three. Then he turns the order over to his purchasing department which figures that the amount specified is too small and multiplies it by three again. Then the purchasing department buys ten times the amount needed!"

Government Hoarding

The biggest hoarders in the land are the Army and Navy. Perhaps it is wise policy from the military viewpoint for the armed forces to own huge amounts of unused raw materials. But the fact is inescapable that constantly increasing orders for defense weapons cannot be manufactured from materials that are being hoarded, whether the materials are owned by the Army, Navy or private industry.

Weakness of the existing set up in Washington is that nobody but the President himself has authority to stop or restrain the armed forces from buying beyond their immediate needs. The newly created Supply Priorities and Allocation Board may ultimately be granted the necessary power to rationalize the situation and allocate the available materials to the various defense and civilian needs according to a sensible plan. But it is not yet certain that such authority will be delegated. As a business organizer the President has a lot to learn, and until he can be persuaded to delegate more responsibilities, or unless Congress orders him to do so (vain thought), the wild scramble for everything will probably continue.

Pieces of Paper

Mainly the scramble is for pieces of paper that bear cabalistic numbers beginning with the letter *A* or *B* and followed by figures and other letters. Business men who cannot acquire one of the coveted pieces of paper feel that their future is black indeed. Seldom do they realize that holders of these pieces of paper still face the problem of getting what they need, for unless the priority rating is AA or A1A, the holders may have to await their turn in the indefinite future.

Expanding Too Rapidly

As it appears today the problems are likely to increase, for the demand for armaments for ourselves and for Lease-Lend beneficiaries is increasing in size. And our basic production facilities are not enlarging correspondingly. General Hugh Johnson reverts to the old proverb about cutting the coat to suit the cloth as illustrative of the need of the times. It is possible to stall the whole industrial machine of the nation by enlarging the defense program too rapidly. There must be a balance somewhere.

Retail Refrigeration Unobtainable

Retail food stores are, for example, finding it difficult to buy needed refrigeration or freezer storage equipment because neither OPM nor OPACS will consider such refrigeration as necessary for defense. Hence there are no priority ratings for manufacturers of such equipment. One wonders if OPM and OPACS realize that steel for food containers is conserved by the use of refrigeration, even though it be at the expense of paper.

Labor Crisis Ahead— Better Get Ready

Demands for processed foods, both for domestic consumption and for Lend-Lease shipments, are bound to increase while the present emergency lasts. While domestic demand for these foods, allowing for the increased quantities eaten by men in the armed forces and for more liberal purchases by fully employed workers, will not increase at the outside by more than 10 percent, no definite figure can be assigned to the needs of Great Britain, Russia, China and others. All

we know is that American food processors will be called upon to produce as never before.

This demand for increased production of processed foods will call for a greatly augmented force of workers for food plants. And there's the bottleneck.

Look for a moment at labor needs for purely defense work. Estimates from Washington indicate that total defense workers, numbered at 4,800,000 by the end of 1941, will jump to an 11,700,000 peak in 1942. Should the war last three more years, the ultimate peak employment on purely defense work is expected to exceed 20,000,000 workers.

According to the August 29 report of the U. S. Department of Labor, total employment in July, 1941, in manufacturing industries (including defense manufactures) was 11,985,000 workers. This means that, if the war continues, defense manufactures alone will require almost double the present total labor force of the manufacturing industries.

Train New Workers Now

While these figures may exaggerate the future labor demand, they are sufficiently accurate to indicate the definite approach of a labor crisis. But food manufacturers are fortunate in this approaching emergency, if they will but follow the same course traveled in 1917-1918. Then it was found that there are relatively few jobs in a food processing plant that cannot be done by women workers. Plans should be laid now to enlist and train women to replace labor that will be taken from food factories by defense plants. Only in this way can prospective demands for food industry output be met.

Why Wait for Evil Day?

Recent seizure of more than 200 carloads of flour in Chicago and Detroit, owned by Gordon Baking Co., emphasizes the need for constant and systematic control over the physical condition and quality of foods and food materials.

Checking of specifications at time of purchase, inspection at time of receipt and control over operations and processes by which raw materials are converted into finished products are not enough. Deterioration in raw materials between their receipt and use can be slight or, as in the case of the Gordon flour, it may run into several thousands of dollars in market value of the commodity affected.

For many years the Gordon Baking Co. has been storing flour for "natural," biochemical, aging. It has studied warehouse design and construction, as well as conditions of storage for flour, and built specially constructed warehouses for storing large quantities of flour. Heretofore, it has escaped the loss of its aged flour on account of weevil infestation.

Safeguards Broke Down

Somewhere its system for safe storage of flour broke down. Severity of the infestation even surprised the FDA officials who carry on regular inspection in storage rooms and warehouses, as well as mills and factories, for indications of insect infestation. Whatever may have been the conditions which favored the development and spread of the infestation, indications are that they were out of the ordinary.

Regardless of the perishable commodity held in storage and regardless of how fortunate has been past experiences, nothing should be taken for granted. Periodic inspection of storage rooms and warehouses by a professional entomologist and constant, systematic maintenance of good housekeeping and checking of temperature and humidity controls are recommended as insurance against an unhappy experience such as that of Gordon Baking Co.

Reward to Research

A 7½ percent increase in the tariff on imported canned Japanese crab meat by presidential proclamation became effective on September 21. According to the U. S. Tariff Commission's findings, domestic consumption of crab meat in all its forms averaged 19,200,000 lb. for the period 1935 to 1939, of which amount 57 percent was canned crab meat. Of this amount 95 percent was imported and only 5 percent of United States origin. Japan supplied 78 percent and the Soviet Union furnished 21 percent of the imports.

U. S. action in this case has been pending for a considerable period under Sec. 336 of the Tariff Act of 1930.

That we have a domestic crab meat canning industry at all in the U. S. is due in considerable measure to the researches of Dr. Carl R. Fellers, professor of food technology at Massachusetts State College, who developed a patented process that will permit the meat of the blue crab to retain its natural color instead of turning to an unsightly gray blue after sterilization. The process is now being exploited in South Carolina by Blue Channel Corp.

The blue crab is principally sold as fresh picked meat, originating chiefly along the shores of Chesapeake Bay. Largely on account of the previous difficulty of the color of sterilized meat, domestic producers have heretofore shied away from canning it, despite the highly perishable quality of the meat and the many health hazards that are inherent in its distribution.

A small tariff adjustment such as this will not be likely to exclude the Japanese product, nor will it solve the technical problems of those who have attempted crab meat canning and have failed, but it will be beneficial to those firms that have enough ginger and initiative to conduct researches that solve the problem.

"Butter Yellow" Not a Certified Color

Newspapers have reported that a number of cancer research specialists have been producing experimental cancer in animals by injection of a poisonous dye known as "Butter Yellow." Because the question has been asked of FOOD INDUSTRIES as to the possibility of this artificial color being a cause of disease, we state here definitely that "Butter Yellow" is not a permitted color, but is merely a name that has no more significance than Cerulean (sky) Blue.

To substantiate the foregoing we quote a letter from the Food & Drug Administration.

"Butter Yellow (Color Index No. 19) is dimethyl-amino-benzene, a coal-tar dye. This dye is not permitted for use in foods, drugs or cosmetics. The coal-tar colors most frequently used to color butter and margarines in this country are Yellow AB and Yellow OB, which are certifiable as harmless and suitable for use in food. These colors when certified are designated respectively as FD&C Yellow No. 3 and FD&C Yellow No. 4."—W. G. Campbell, *Commissioner of Foods & Drugs.*

PUTTING FALSE FACES ON FORMULAS

By W. R. VAN METER
Kingston Cake Co., Kingston, Pa.

You can disguise a valuable formula so that workmen do not get wise to it and competitors cannot steal it. The idea is to use arbitrary units of measurement and adopt coined names for ingredients. There are other tricks, too.

IN food plants, the formulas, the mixing methods and the process temperatures used constitute a valuable part of the company's technical assets. The old sailor saying, that "God makes the food, but the Devil sends the cooks," is still true today. Methods of mixing, time and temperature of cooking, degree and kind of intermediate processing of ingredient materials—these are as important as the actual weights of ingredients used.

Analytically, product *A* and product *B* may be identical. The chemist says so in his report. The consumer, however, stubbornly insists that he likes product *A* enough to buy it in huge quantities, meantime pointedly ignoring product *B*. If you were to show him the chemist's report, it would only strengthen his conviction that chemist's are wacky anyway, for on the score of taste, flavor and general savoriness, product *B* is obviously not even in the same class with product *A*.

Consequently, the protection of the formula—and by this term is meant all the factors of time, temperature, ingredients and handling that go to make a particular product—against disclosure to unauthorized persons becomes sufficiently important to justify considerable thought and energy. The means taken to safeguard formulas vary widely with different companies.

It is intended here to discuss a system which is simple, easily workable and yet very effective. It will not, of course, produce the formulas that are worth guarding. That is a job for a first class food technologist working with the plant organization.

Consider what is, in so far as possible, to be kept secure in the production manager's files:

1. The time, temperature and pressure factors in the cooking or baking of finished products. Likewise for intermediate products.
2. Mixing methods.
3. Identity of materials used in making both finished and intermediate products.
4. The actual weights of various ingredients in formulas.

Control Units

Essentially, the safeguarding of this information can be accomplished by adoption of arbitrary measuring units—which mean something within the plant but not outside it—by arbitrary designations for some few key ingredients, and by so arranging work in the weighing, mixing and processing departments that no one individual becomes conversant with every step.

The adoption of an arbitrary measuring unit for thermometers and pressure guages used in cooking and baking operations will effectively safeguard these formula factors. Probably the simplest way in which this can be done is to raise or lower the scales of all thermometers and gages a set number of degrees. Use of the Centigrade scale has the advantage of being less familiar than the Fahrenheit. Obviously, all thermometers in use throughout the plant should be set to read the same.

There need be no confusion once this is done. All cooking, baking and processing is finished to a definite thermometer or gage reading, which is all the operator needs to know in order to perform his part of the job intelligently. An example of the way this works out would be as follows. It is desired to cook a sugar sirup to 235.4 deg. F. The plant thermometers have all been changed over to the Centigrade scale. The scales of these thermometers have been set to read 20 deg. below the actual temperature. Therefore, the operator's instructions would be

"Flour, 1 nol. Water, 2 nols and a mid. Shortening, 1 sem. Salt, 1 smidgen. What's this, a nut house?"—Arbitrary measures fool them every time.

to cook to a temperature of 93 deg. C.

Mixing Methods

Regarding mixing methods, three things can be done to secure this point. First, the mixing, so far as possible, should be split up so that no one operator performs the whole operation from beginning to end. Second, the materials making up a batch should come to the mixing room already weighed and grouped. Third, as frequently as can be, intermediate processed materials should be used in making up batches. If the plant has an alert food technologist on the payroll, he will have quickly discovered that such processed materials can both improve products and lower costs. As a general thing, these intermediates will come to the mixing room in the form of jellies, pastes or solutions. Their composition is unknown to the mixing operator.

Unidentified Ingredients

Masking the identity of key materials used in the formula also offers another means of protection. Roughly, materials used in the food plant fall into two classes—those bought and used without alteration and those which undergo a secondary processing within the plant before going into the final product.

In baking, for example, flour is one of the important items of a formula. The type and brand of flour plays a vital part in securing certain effects in baked products such as cakes and pies. Particularly is this true if, by experimentation and baking research, formulas have been developed which give superior products but demand a high degree of control over all variables to be successful. In such cases, the brand of flour is one of the key variables, and its identity should be closely guarded.

To do this, all flour coming into the plant should be designated by number or some code letters. Sacks should not be marked with brand or manufacturer's name, but simply by whatever numbers or letters have been chosen to designate that particular flour. Assuming that the flour has been given a number, then in all formula records, it should be referred to only by that number. In the bins of the weighing department it should be known only by number. So it goes throughout the plant.

A kind of rough-and-ready shorthand can easily be invented for other important ingredients. Under such arbitrarily chosen tags, many of the ingredients will be known by no other names from the time they enter the plant until the time they leave; a fractional part of one of the products. Of course, a certain number of people get to know, for instance, that "C.S." is cornstarch, or that "Jap" means agar-agar. The possession of scraps of information is not significant; the goal of any formula protection system is to keep a *working knowledge* of the whole from going outside the plant.

Moreover, the designation of ingredients by code letters or numbers safeguards the written formulas should they accidentally fall into other hands.

W. R. VAN METER

Weighing Ingredients

The simplest, yet one of the most effective ways to keep information about the actual weights of materials used in formulas a secret is not to weigh any part of the batch in the conventional pounds and ounces. Arbitrary measuring units, units of mass adapted to the requirements of the plant, should be chosen. Nothing then is weighed in pounds or ounces. None of the scales in the plant weighs in pound-ounce units. Instead, all scale beams have been adjusted to register in the arbitrarily chosen units. The scales should be bought from the manufacturers set to whatever units the plant has adopted.

For the operator, this means no change in the weighing operation. It is neither more nor less difficult than usual. Assuming that a three-unit system has been adopted, the operator will, of course, have to change riders on the scale beam as he changes from weighing in one unit to another.

Most plants will find that a three-unit system is adequate. For example, one unit may weigh six-tenths of a pound, one will weigh three tenths of a pound and one will approximate an ounce, either somewhat more or less.

Names are chosen for these units. Suppose the largest unit is called a "nol," the second a "sem," and the smallest a "mid." Short, coined terms are best for this purpose, though actually any words will serve. The essential point is that all ingredients should be weighed in units which mean nothing outside the plant if by chance the information gets out that "45 nols of sugar and a 100 mids of shortening" are used in one batch of "Fluffy Wuffies."

Relatively minute amounts of ingredients are best weighed in grams. Though this serves the purpose of accuracy most, still it is not without other value, for metric system units are strange ground to most plant employees.

Now it is quite true that errors can arise in such a system of weighing, errors that would be less likely to occur if all ingredients were weighed in conventional pound-ounce units. However, the possibility of error is not nearly so great as might appear at first glance.

Consider the case where the operator, instead of weighing water in "nols," which is a 0.6-lb. unit, scales it off in "sems," which is a 0.3-lb. unit. Naturally, there will then be just half as much water as the formula calls for —a mistake that is going to be very noticeable if the operator is alert. Should the error be made the other way, then there will be just twice as much as is called for—and that, too, is going to be evident at once. Or if it isn't, then what is needed is not a return to the old system, but a return to a new operator.

The ingredients of formulas can be divided into groups, either on an arbitrary basis, or dependent upon the relative weights of each ingredient going into the batch. By the latter method, sugar, flour and water would always be weighed in the largest unit. On an arbitrary basis, these three materials could each be weighed in a different unit. The conditions in the plant, the actual content of the formulas and the handling of the batches are the factors which will dictate what materials are weighed in which units.

It is important, too, in weighing-off batches that the work be split up in such a manner that one operator does not weigh-off all the materials in the batch. This is to prevent the memorizing of a formula in its entirety, which quickly happens when one person habitually weighs off all the ingredients of the batch. The amount of information which any one person can acquire about the make-up of the formula should be limited in every way consistent with good management.

Such a system as has been outlined here will effectively safeguard formula information. If dollars have been spent in research and experimentation, in perfecting formulas, in taking their products out of the "ready-made" class, then keeping that information within the plant where it originated means dollars, too.

Economic Operation Of Batch Extractors

By W. L. FAITH, W. J. PETERSON and MORTON SMUTZ*

Department of Chemical Engineering, Kansas State College, Manhattan, Kan.

Useful engineering data on extraction processes has up to now been largely lacking. But this article remedies that situation. It gives the results of an engineering study at Kansas State College. Extraction is becoming increasingly useful as a tool in food manufacture.

IN recent years the addition of small amounts of chemical substances to foods, or in some cases their removal, has been increasingly important. Examples of this are the addition of vitamins and the removal of alkaloids. Actually, the addition of vitamins often necessitates their prior removal from other sources. In either case, where substances present in small amounts are to be removed from a material, extraction by liquid solvent is usually the safest and cheapest means. In the food industry, these extractions are usually batch processes.

Unfortunately, very few quantitative data are available from which one might determine the optimum operating variables for a given extraction system. This lack of knowledge, in turn, usually results in inordinately high operating costs.

This does not hold true, of course, in large-scale processes, such as the extraction of soybean oil, which have been studied exhaustively.

Pilot-plant Extractor

Work in the chemical laboratories of Kansas State College, on the preparation of vitamin concentrates and vitamin-free feeds for animal nutrition studies, made necessary a study of the design and operating variables of a pilot extraction unit. Some of the results of this test were thought to be of sufficiently general interest to warrant publication.

Figure 1 shows a photograph and Fig. 2 a diagram of the Pfaudler glass-lined extraction unit used in this study. The unit consists principally of a steam-heated boiler in which the solvent is vaporized, a condenser to liquefy the vapors and a jacketed extraction chamber in which the solvent contacts the material to be extracted. The solvent from the condenser collects in the extraction chamber in intimate contact with the solid to be extracted until the chamber is filled. At this point, an automatic siphon removes the extract and solvent from the chamber and returns it to the boiler or still pot. The solvent again vaporizes and is reused. The extract therefore concentrates in the still pot until the extraction is completed, at which time the solvent may be removed by distillation.

All parts of the apparatus that come in contact with the extract are glass lined to prevent possible decomposition of the extract by the catalytic effect of metal, and also to prevent corrosion.

Figures 3, 4 and 5 show typical logs of the extraction of soluble materials from meat scrap, Kafir and bagasse, respectively, using suitable solvents. In each case it may be noticed that the initial rate of extraction is high, and that the rate falls off markedly after the extractor has been filled and emptied several times. Since the usual operating procedure is to distil the solvent at a constant rate, this falling rate raises the cost of the extraction process. Consequently, one will soon reach a concentration of extractable material below which it will be uneconomical to operate. There are cases, however, where the residual concentration in the solid must meet specifications below this economic value. In those cases, extraction must be continued regardless of cost.

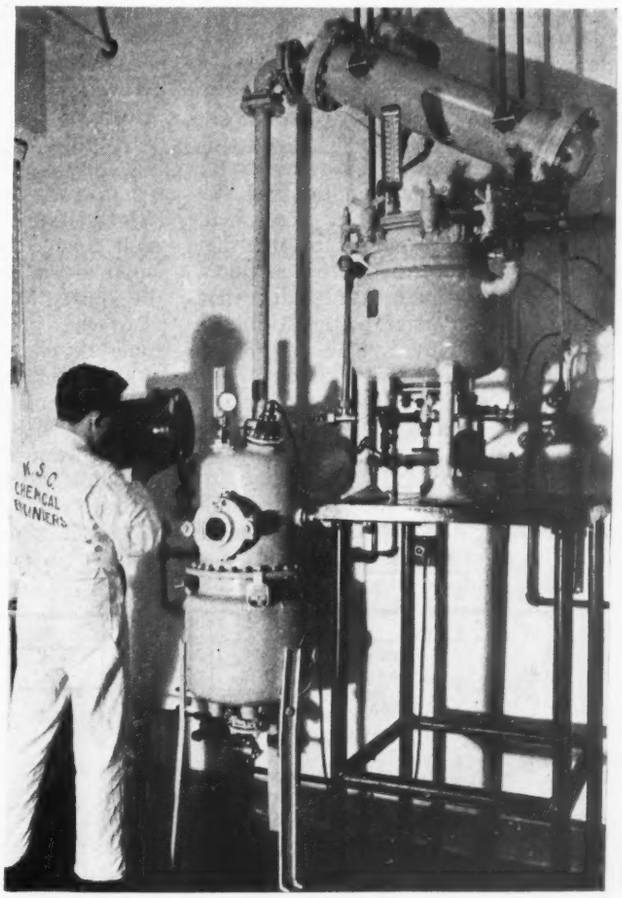


Fig. 1. This is the pilot plant at Kansas State College, where the experimental work on batch extraction of food materials was carried out.

* Present address: Monsanto Chemical Co., St. Louis, Mo.

Effect of Variables

By proper control of variables, extraction costs may be brought to a minimum for a given operation. The most important variables affecting extraction rate are generally recognized as temperature, time, solubility and particle size.

In general, since extraction is a diffusion process, the rate increases with a rise in operating temperature. The boiling point of the solvent, and the susceptibility of the extract to decomposition by heat, place practical limitations on the temperature which may be employed. Accordingly, extraction should be carried out at the highest temperature compatible with these limitations.

Although the time of extraction is theoretically an operating variable, it depends to a great extent on the design of the extraction apparatus, and will be considered later.

The effect of solubility is obvious. Everything else being equal, the solvent chosen for the extraction should be that one in which the extractable material is most soluble. This factor affects the rate of extraction to a greater extent than is usually supposed.

Still another factor affecting the rate of extraction is the size of the individual particles which are subjected to extraction. Up to a certain point the rate increases as the particle size decreases. Two practical factors prevent size reduction below a certain minimum. One is the cost of grinding and the other is the likelihood of very small particles packing so closely together that the solvent cannot pass between them. This resulting agglomerating effect may then result in larger particles from a practical viewpoint, even though the individual particles are smaller. Plant materials such as alfalfa are particularly susceptible to agglomeration.

Economics of Extraction

Theoretically, we are interested only in increasing the rate of extraction in order to reduce costs. Practically, however, the price one pays for an increased extraction rate may become unreasonable if other economic factors are disregarded. The most important of these other factors are capacity, solvent losses and steam consumption. The lowest overall cost is obtained by the proper balance of these economic factors against increased extraction rate.

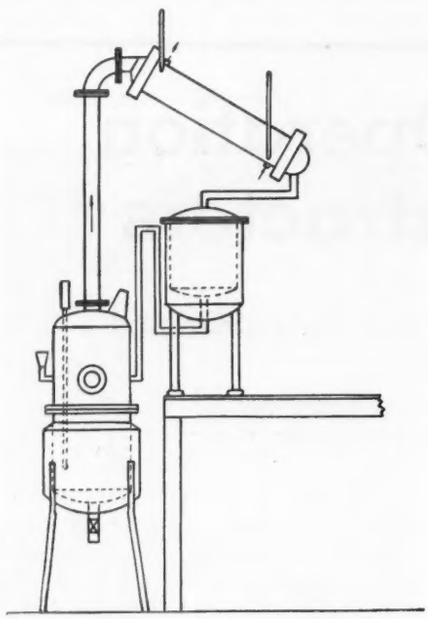


Fig. 2. Diagram of pilot plant for batch extraction tests.

Unfortunately, in most batch operations, most of the economic factors are functions of the design of the particular extraction unit in question. A very great change in operating method may entail a modification in the design of the unit. With equipment of pilot-plant size these variations may sometimes be effected with little difficulty.

The effect of such changes on the economics of the extraction process was strikingly shown by some of the experimental work performed on the Pfaudler extractor mentioned previously. This extractor was designed to operate in much the same manner as a laboratory Soxhlet extractor, in that after the extraction chamber was filled with solvent, it was dumped back into the still proper by means of a siphon.

Invariably, it was noticed that after about two or three dumps the rate of extraction dropped rapidly, and since the rate of solvent distillation remained the same, the cost of steam per unit of material extracted rose sharply. This indicated that a decrease in distillation rate should lower steam costs without markedly decreasing the extraction rate. Actually, in most cases, it was found that distillation could even be stopped for varying periods of time while allowing the solid to be thoroughly soaked with solvent. A log of such an extraction is shown in Fig. 6. The advantage in steam cost is obvious. All systems do not show this advantage. An example is the extraction of casein with ethyl alcohol as shown in Fig. 7. In a few cases where a soaking period is most advantageous, it is often necessary to dump the extraction chamber several times after completing the soaking period in order to wash out entrained extract. A case of this type is shown in Fig. 8.

During the study of alternate soaking and dumping it was found that this method produced greater yields of extract in a reasonable time than the normal Soxhlet method. Upon investigation, it was found that even though the solvent flowing over the solid to be extracted was well distributed at the top of the extractor, the solid near the top was incompletely wet. This resulted in the top portion of the solid being much less extracted than the bottom. A soaking period tended to eliminate this difficulty.

Subsequently, the dumping feature of the extractor was eliminated and a "continuous soaking process" studied. Use of this process involved the continuous removal of extract from the bottom of the extractor at the same rate that fresh solvent entered the top. This gave the extraction process a continuous nature and at the same time sub-

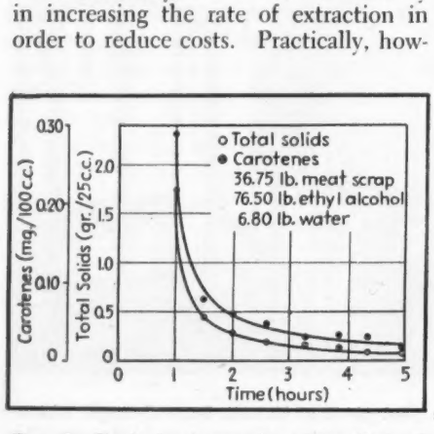


Fig. 3. Typical curves for extraction of meat scrap.

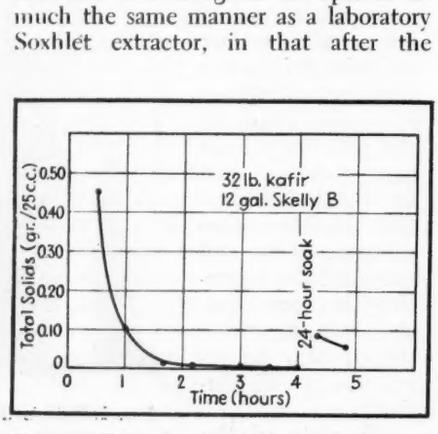


Fig. 4. Typical curve for extraction of Blackhull Kafir, showing effect of soaking.

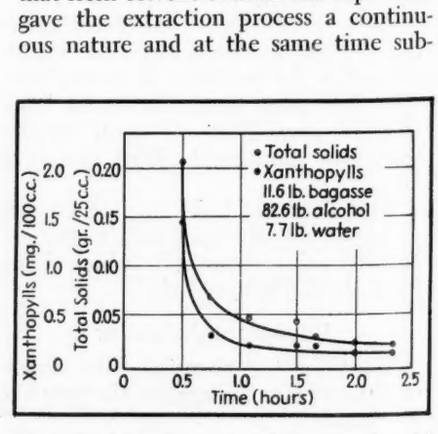


Fig. 5. Typical curves for extraction of bagasse.

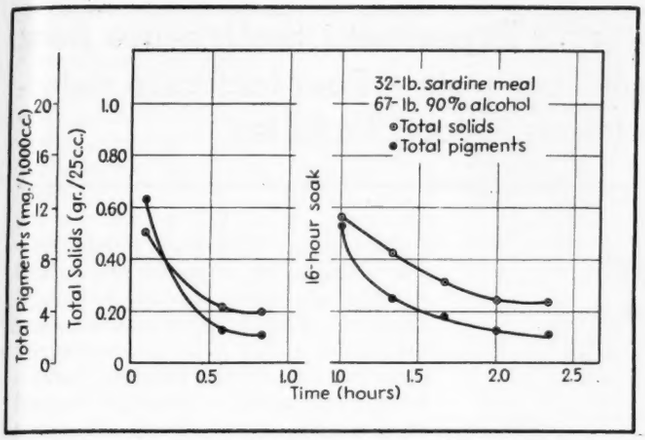


Fig. 6. Extraction curves for sardine meal, with 16-hour soaking period.

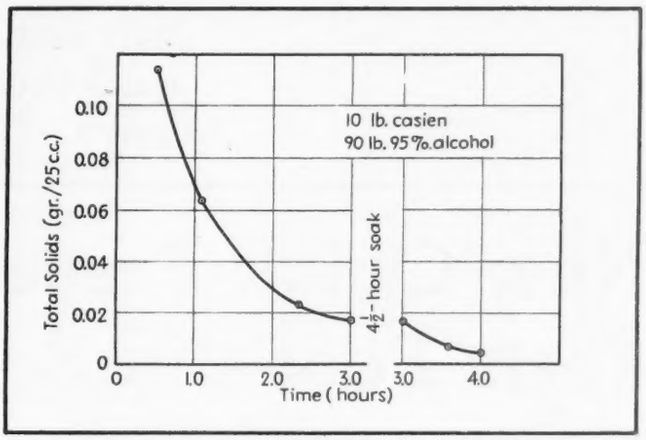


Fig. 7. Extraction curve for casein with 4.5-hour soaking period.

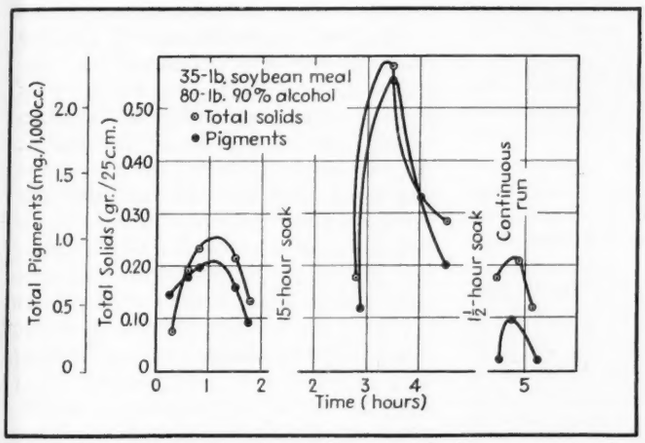


Fig. 8. Extraction curves for soybean meal show necessity for washing after soaking.

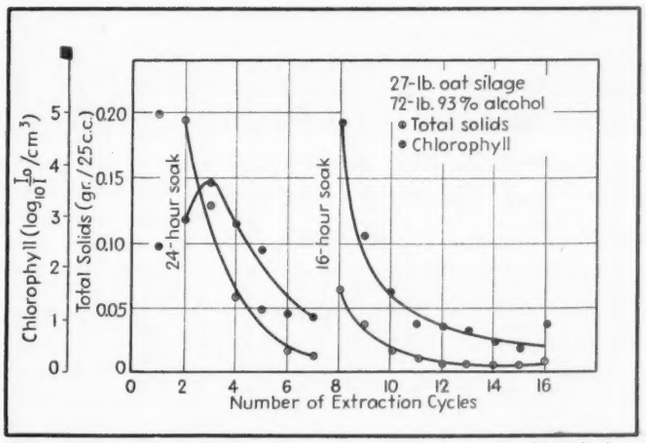


Fig. 10. Extraction of oat silage using preliminary soaking before "continuous soaking."

jected all of the solid material to constant soaking. Figure 9 shows a comparison of continuous and dumping methods in the extraction of Blackhull Kafir with Skellysolve B. Various modifications of this "continuous soaking process" were studied. In general, it was found that distillation could be stopped for varying periods of time with the same advantage as shown over normal Soxhlet operation. A preliminary overnight soaking period was of especial advantage. Figures 10 and 11 show results of these two types of operation.

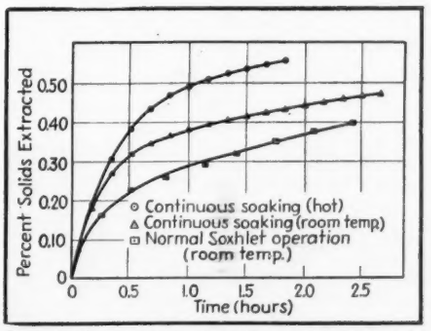


Fig. 9. Comparison of continuous and batch operations in the extraction of Blackhull Kafir with Skellysolve B.

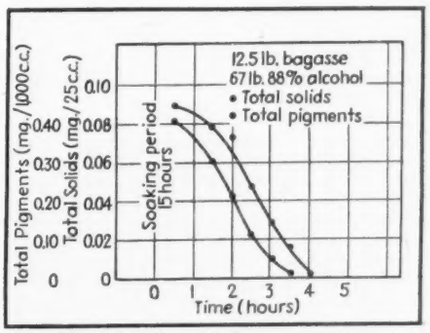


Fig. 11. Extraction of bagasse using preliminary soaking before "continuous soaking."

Conclusions

Based upon the above experience, certain rules for the economic extraction of solids from organic materials in a batch extractor appear obvious. These may be listed as follows:

1. In the ordinary operation of a pilot-plant size Soxhlet extractor the rate of extraction drops markedly after the first three or four dumps. At this time the solid should be allowed to soak for several hours before continuing normal operation. This alternate dumping and soaking should be repeated several times before the solid can safely be considered to be completely extracted.

2. After a soaking period, several dumps are often necessary to wash all of the extract from the solid.

3. A preliminary soaking of the solid overnight is usually advantageous.

4. In those cases where speed of the extraction is most important, the usual pilot-plant Soxhlet extractor may be modified to make it essentially a continuous process with a consequent increase in the rate of extraction.

5. In all cases the extractor should be operated at the highest temperature compatible with the stability of the material being extracted.

6. No set of general rules can apply in their entirety to a particular case. A few well-chosen experiments will usually indicate the type of operation and modification of design that is most suitable.

PRODUCTION

TVA and Georgia Experiment Station use new quick freezer in crop tests • Four factors in detergency • Accidents in food factories

New Quick Freezer Tests Foods in South

By EARLE MAULDIN,
"Food Industries," Atlanta, Ga.

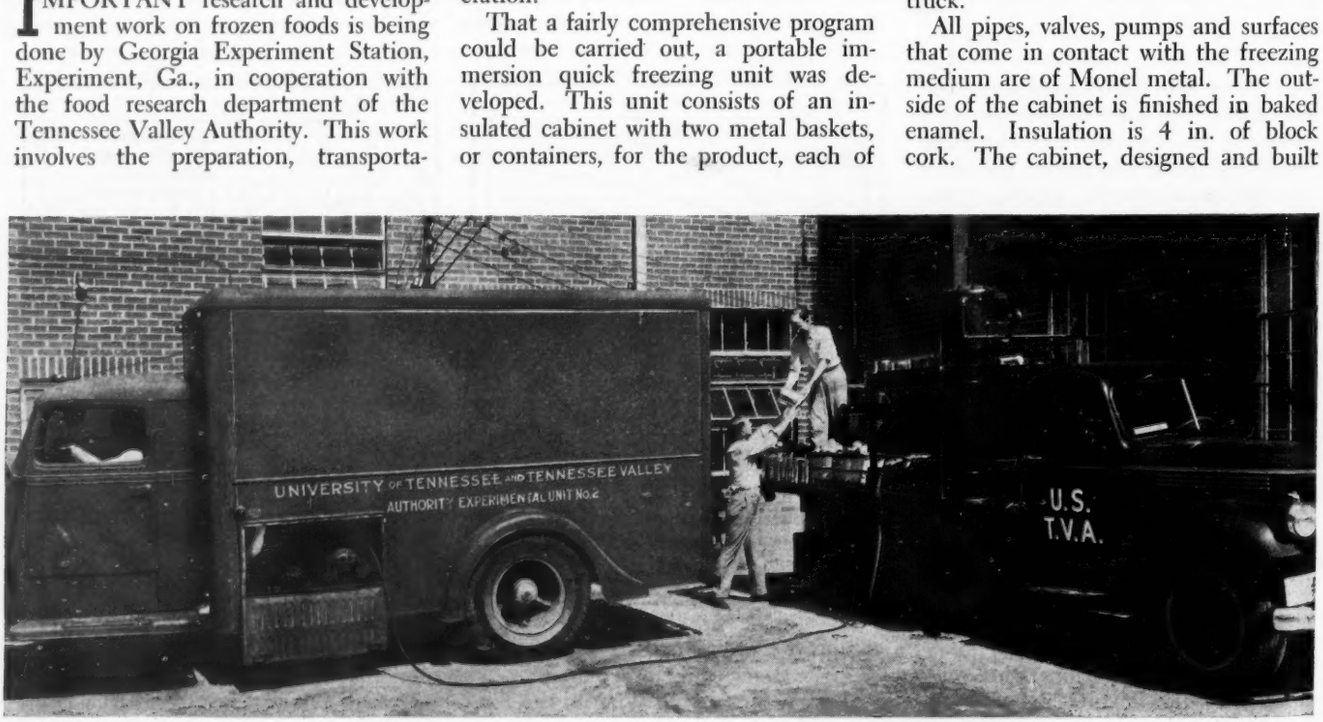
Experiments in freezing fruits, berries and poultry, conducted in five states by TVA and Georgia Experiment Station, point way to successful commercial operations. Immersion unit on truck freezes products for delivery in refrigerated truck.

IMPORTANT research and development work on frozen foods is being done by Georgia Experiment Station, Experiment, Ga., in cooperation with the food research department of the Tennessee Valley Authority. This work involves the preparation, transportation and marketing of frozen foods. It is a twofold project: An engineering problem in developing a practical process and in designing and building the necessary equipment; and a technological and economic problem in developing a product which is satisfactory from a marketing, storage and consumer angle. J. G. Woodroof, food technologist for the experiment station, is devoting his efforts during the tests conducted this season to the production and preparation of the various products while TVA completes the operation.

That a fairly comprehensive program could be carried out, a portable immersion quick freezing unit was developed. This unit consists of an insulated cabinet with two metal baskets, or containers, for the product, each of about 20-lb. capacity. These rotatable baskets are mounted on vertical spindles and serve also as centrifugal extractors of the freezing medium after the freezing has been accomplished. Spindles are driven through V-belts from ½-hp. motors. Controls located on front of cabinet afford low speed for agitation and high speed for extracting. Convenient foot brakes are provided to bring the baskets to a quick stop after high-speed rotation.

The freezing medium is a 50 per cent glycerine and water solution, adjusted to a specific pH, for freezing peaches, circulated rapidly by a pump which is also driven by a ½-hp. motor. Approximately 180 gal. of solution is required. This medium is cooled by means of a 4x4 compressor driven by an automatically controlled 7½-hp. motor, at 1,740 r.p.m. A condenser completes the outfit. The entire equipment is mounted on a 1-ton truck with a flat body. Electric cables and connections are provided for plugging in to a 220-volt circuit, or the entire unit can be driven directly from the motor of the truck.

All pipes, valves, pumps and surfaces that come in contact with the freezing medium are of Monel metal. The outside of the cabinet is finished in baked enamel. Insulation is 4 in. of block cork. The cabinet, designed and built



Transferring frozen peaches from portable freezing unit to refrigerated truck. J. G. Woodroof is receiving container from E. C. Grubbs. The sealed, 10-lb. tins of peaches are held at near zero temperature in the truck for the duration of the journey.

by TVA engineers working with Mr. Woodroof, has a capacity of approximately 180 lb. of peach slices, or strawberries, per hour.

The mobility of the unit makes it convenient for experimental purposes. It has operated during the 1941 season in Alabama, Mississippi, Georgia, Tennessee and Virginia, freezing strawberries, apples, peaches, youngberries and chickens in Cry-O-Vac bags. While the work is of an experimental nature, it has several times pointed the way toward successful commercial operations.

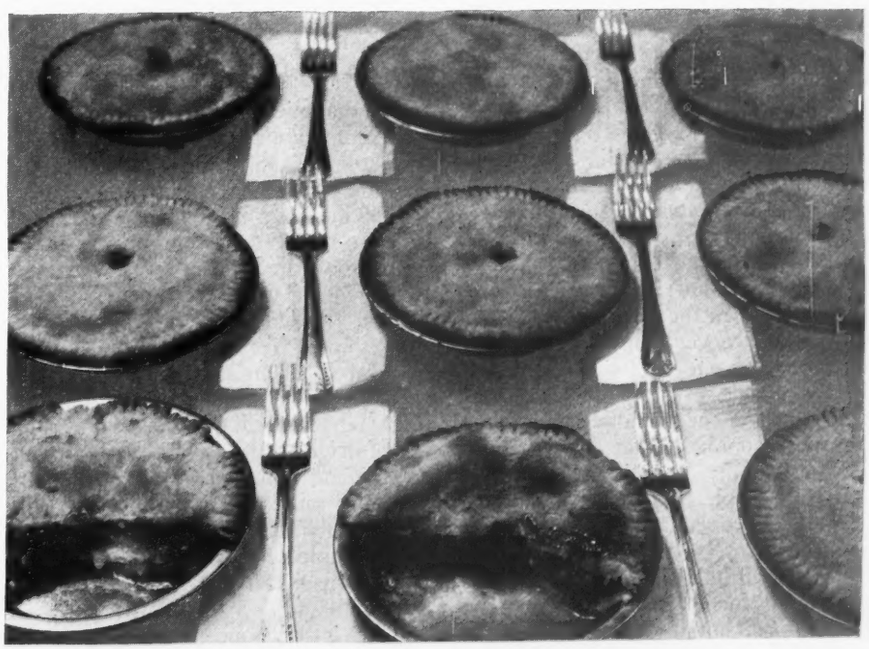
Peaches being packed at the Georgia station are gathered from the station's own orchards. They are excellent specimens of Elbertas and are uniform as to size and condition. The peeling operation is effected with a 5 percent lye solution at 145 deg. F., with a wetting and rinsing agent added. Immersion is intermittent and is carried on for about two minutes for a thorough removal of the skins. After peeling, the peaches are washed, sliced by hand with an average of 8 to 10 slices to the peach, then blanched in acidified water at 190 deg. F. for two minutes.

A series of over 200 pie cooking tests was conducted to determine the proper temperature and the length of time required for this process, to prevent browning and preserve the fresh flavor, texture and color. It was found that with this method the frozen peaches could be left out overnight to thaw, with the assurance that they would not brown. Mr. Woodroof, after experimenting to produce a superior peach pie pack, recommends scalding the peach slices in a 2 percent citric acid bath at 190 deg. F. for a period of two minutes.

Freezing immediately follows the blanching bath. The freezing basket accommodates a batch of from 18 to 20 lb. It is rotated slowly while the freezing solution is circulated through. This solution is maintained at 0 deg. F. A batch is frozen hard in 5 minutes. The peaches are then transferred to 10-lb. tins with inner surfaces lacquered. Tins are sealed and placed in the refrigerated truck or cold storage compartments, held at near zero temperature.

This frozen peach package, called an "institutional pack," is especially designed for hotels, restaurants and hospitals and is adapted to the making of pies, cobbler, tarts and salads. A great deal of attention must be given to the variety and degree of ripeness of the peaches for pies. Each peach must be fully ripe and deeply colored throughout in order to produce a highly flavored and highly colored pie.

E. C. Grubbs of TVA is here placing peach slices in the freezing basket of the portable freezing unit mounted on a truck. From left to right are J. G. Woodroof, Georgia Experiment Station; E. C. Grubbs; Earle Mauldin, "Food Industries"; L. C. Nance and M. E. Crawford, Southern Frozen Foods, Inc.; and I. T. Olsen, Georgia Experiment Station.



Pies baked for testing purposes. Accurate scores were compiled, after a series of tests in which the pies were graded for flavor, texture, color, juiciness and aroma.

On the other hand, they must not be very "soft ripe" or the peach will appear mushy in the pie. The slices must be quick frozen in order for them to maintain their full shape in the pies, according to the findings of the experiment group.

Frozen peaches have long been used in ice cream, where texture of the peach in the final product was not important, nor was color of major importance. Difficulty of maintaining natural flavor, color and texture in finished pies has heretofore caused pie bakers to use frozen peaches but very little. It is believed that such researches as are being pursued by the Georgia Experiment Station and TVA will open a comparatively new market for peaches grown in the South.

Four Basic Factors In Detergency

By FOSTER DEE SNELL

Foster D. Snell, Inc., Brooklyn, N. Y.

Getting equipment and containers really clean is largely a matter of the correct choice and utilization of cleansers. Some of the factors influencing cleanser choice are given here* by a consulting chemist and engineer of wide experience.

WHILE cleanliness is desirable in many industries, it is essential in all phases of the food industries. Detergency may be freely translated as the pursuit of cleanliness. To the technologist it is a complex mixture of chemistry and physical chemistry, to the technician something often mildly described as the bane of his life.

The known factors in detergency are: (1) Initial alkalinity or pH of the detergent solution, (2) total alkalinity or buffer value of the detergent solution, (3) effect in lowering of interfacial tension between the foreign matter and water, (4) deflocculating and emulsifying power. Each will be taken up, in that sequence. Many special cases include only some of those factors, but the most complex cases include only those listed.

In various phases of the food industries one has to remove bacteria, residual food, dust, foreign precipitates and just plain dirt, all of which the technologist considers as foreign matter, whatever the source. So, initially one must set up a standard of what can be considered as typical foreign matter, bearing in mind that one is trying to generalize on a standard for the entire industry.

Synthetic Dirt

Chemically, one can visualize the presence of inert particles insoluble in water, saponifiable oils, unsaponifiable oils, free fatty acids, proteins and carbohydrates. A synthetic foreign matter can be built up on that basis. As plain dirt one selects carbon black. It should be inert, represent the most serious contamination by inert foreign matter and only a trace need be present to be detected by color. Alternatively, in other work burnt umber has been used. It is silicious in nature and inert. For saponifiable oil, corn oil or cottonseed oil or any other saponifiable oil of very low, known fatty acid content is suitable. As unsaponifiable oil a standard grade of highly refined mineral oil is chosen to insure that it is of known and duplicable composition. The synthetic foreign matter is therefore:

Carbon black	4 grams
Mineral oil	5 grams
Cottonseed oil containing 0.38 percent free acidity as oleic	.3 grams

In some applications, particularly when applied to fabrics, this is diluted with a volatile solvent such as carbon tetrachloride which subsequently evaporates.

Proteins have been ignored because they are removed by solution in water. And carbohydrates, if not water soluble, are so much more inert material and can be typified by the carbon black. That sounds like quite a mess, and it is. But in deterging a surface no one will dispute that materials as difficult must be removed. Of course, if the inert foreign matter is white rather than colored and is not removed, it will not look the same as carbon black. But fundamentally, the above synthetic mixture is based on having one which can be shown visually to be present or absent.

That is only one possible synthetic mixture representing foreign matter. A great deal of work has been carried out with one consisting only of petrolatum and carbon black. The more complex one has a better theoretical basis.

Having a representation of the foreign matter one is ready to visualize what happens when it is removed. As a fundamental hypothesis, assume that no "clean"—that is, unoiled—dirt is present. In other words, if dirt has nothing to stick it on, it will fall off or brush off. Dirt which adheres closely to a surface is coated with at least a mono-molecular film of oil or grease. One calls it oil to avoid confusion with compounded greases used for lubrication. While such dirt is essentially acid in nature—because all saponifiable oils, even of food grade, are acid—most contamination known as dirt is more acid than that.

Why Alkaline Cleansers?

To digress slightly, if a practice is rather generally followed industrially or in the home, there are two scientific attitudes we may take. One is to assume that its rather general adoption is due to some fundamental reason which justifies it. The adoption may have been by trial and error, but scientifically one may look for reasons for its adoption. The other is to ignore it. The first attitude appears preferable. Practically all cleaning materials used industrially are alkaline. Perhaps that statement is open to question until explained. Soap is the most common cleaning material. The pH of a soap solution free from excess alkali or builders is 10.2. So it is alkaline with respect to the usual neutral point of pH 7.0. And what liars that makes out of people who talk about neutral soap—except in a special and carefully limited meaning. For purpose of discussion, pH 10.2 is referred to as the neutral point of soap. Any pH lower than that means partial decomposition, any higher one means that alkali or builder has been added.

But to return to alkalinity. Why are so many detergents alkaline? The answer is mainly because alkaline cleaning materials react with the fatty acid in the foreign matter and assist in its removal. Substantial amounts of alkalinity are destroyed in any typical cleaning operation. Some may be adsorbed and some destroyed by carbon dioxide from the air, but some destruction is due to the measurable acidity present.

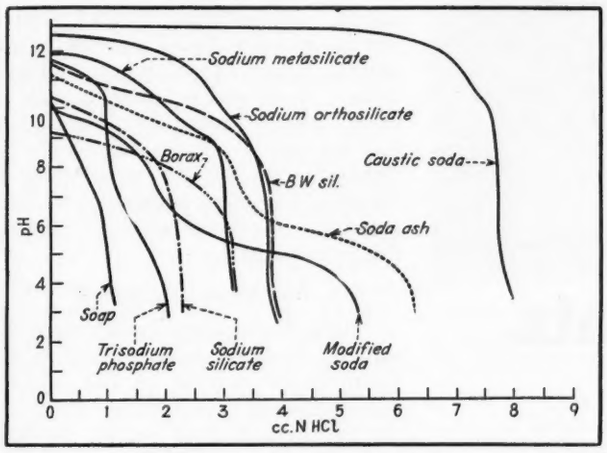
Foreign matter is more readily removed by a strongly alkaline washing solution than by a weakly alkaline one. As measured by pH, the first factor is the initial alkalinity. Thus a solution of borax and soap is not as effective as a solution of soda ash and soap. And soda ash and soap is not as effective as sodium metasilicate and soap. And beyond that alkalinity are sodium sesquisilicate and sodium orthosilicate at even higher levels. Of course one must consider the surface being cleaned and, for example, not use too high an alkalinity on aluminum or tin. But higher alkalinity with silicate is permissible than with other alkaline salts.

Economy of "Builders"

Since the foreign matter is acid, it follows that it will destroy some alkalin-

* A revised form of an address presented by Dr. Snell before many sections of A.C.S., A.S.T.M. and other technical bodies, especially prepared for *Food Industries*.

ity and therefore the next factor is total alkalinity above pH 10.2. Why above pH 10.2? Because with the neutral point of soap at that level, when pH falls below 10.2 soap is being destroyed. "Builder" costs 2 to 5 cents per pound, soap over 10 cents. So it is bad economics to neutralize acidity of the foreign matter with soap. This is beautifully illustrated in the usual laundry cycle. The first operation is a "break" with plain alkaline salt solution. Why? To neutralize the acidity of the foreign matter on the fabrics and thus start the cleaning operation. Of course this cold break has other functions that are not pertinent to this discussion or to the use of detergents in food products plants.



Electrometric titrations of 0.66 percent solutions of soap and common soap "builders," expressed as pH.

This factor of total available alkalinity is sometimes phrased as buffer action. If limited to buffer action above pH 10.2, that is a correct description.

These two factors of initial alkalinity and total alkalinity can be nicely evaluated from comparative electrometric titration curves of the "builders" being compared. Such curves as illustrated herewith show that in terms of initial alkalinity, the order of decreasing value is caustic soda, sodium orthosilicate, sodium metasilicate, trisodium phosphate, soda ash, modified soda and borax. Sodium sesquisilicate falls between the orthosilicate and metasilicate, but is not shown. In terms of available alkalinity, the series is similar but with a reversal of the order of soda ash and trisodium phosphate.

Wetting Power

The third factor was lowering of interfacial tension, often referred to as wetting power. The subject is complicated by interrelation of factors. When foreign matter is displaced from a surface, it is wet and floated off. But one cannot really measure interfacial tension between a solid and a liquid. Hence it is fortunate that dirt has a surface with the properties of a liquid—the oil film on its surface. This factor then is readily measured by the stalagmometer method using a mixture of equal parts of mineral oil and vegetable oil with a known acidity as one liquid, the "built" soap solution as the other.

Of course, the complications of detergent chemistry pile up as we go on. The formation of soap in the interface by reaction of the detergent solution with the fatty acid in the foreign matter is a big factor. And if the alkalinity is great enough, the interfacial tension becomes so low as to be unmeasurable. When one type of stalagmometer is used, the water falls through oil; with another the oil rises through the detergent solution. The latter more closely approximates actual detergency. But the results by the two methods check rather closely.

On the basis of lowering of interfacial tension, the order of decreasing value of "builders" with soap is the same as for available alkalinity. This is illustrated in Table I, which shows some typical data obtained with a simple substitute foreign matter suitable for this particular purpose, benzene containing 0.1 percent of free fatty acid. The last line is interesting, in line with theoretical consideration, as showing the effect of addition of common salt to soap. It has no practical application.

Removal of Dirt

After the foreign matter is loosened from the surface to be deterged, it must be dispersed as discrete particles or deflocculated. Then it must be floated away—emulsifying power. The combination is the fourth factor, because the two properties cannot be separated. Properties in suspending a special oiled umber indicate that phosphates and silicates are relatively efficient in this property, all other "builders" are poor. Soaps are efficient. Data are shown in Table II in a form to illustrate the interesting fact that with mixed soap and another detergent this factor is additive.

Combining the factors in methods of evaluation of the rate of removal of foreign matter shows the composite in the descending order sodium orthosilicate, sodium sesquisilicate, sodium metasilicate, caustic soda, trisodium phosphate and soda ash. The weakness of caustic soda in deflocculating and emulsifying power radically lowers its value in a composite evaluation.

But all of this must be tempered with reason, of course. Many detergent operations require that the solution come into contact with human hands. There humanity, as well as compensation laws, prevents the use of highly efficient mixtures of alkaline salts with soap, in favor of less irritant ones. In others, contact with the skin is avoided.

Case of Hard Water

In the presence of soap alone, calcium and magnesium compounds present as hardness form curds of heavy metal soaps. Recent progress in the art has been to add sequestering agents to avoid this precipitation. Tetrasodium pyrophosphate is the most important and is already present in most proprietary "built" soaps sold as granules. Sodium hexametaphosphate is somewhat more efficient and much more expensive. Organic agents are also available having this property. The use

TABLE I—Comparative Interfacial Tensions in Dynes of Different Ratios of Soap and Builder Against Benzene and 0.1 Percent Free Fatty Acid with Dimmig Stalagmometer.

	0.033 percent builder alone	0.1 percent soap, 0.033 percent builder	0.05 percent soap, 0.05 percent builder
Sodium hydroxide	1.0	1.0	1.0
Sodium metasilicate	10.80	6.54	5.26
Trisodium phosphate	12.95	8.45	8.21
Sodium carbonate	10.80	6.75	6.02
Modified soda	14.95	10.87	11.31
Sodium chloride	28.86	9.73	14.68

TABLE II—Comparison of Emulsifying Power of Alkaline Salt and Soap Solutions, Individually and Together.

0.1 percent solutions	Umber Suspended: Sum of values for alkalies alone + 46.6, value for sodium oleate alone	Umber Suspended: Values determined for alkalies and sodium oleate together	Difference
	mg. per 100 c.c.		
Sodium hydroxide	67.5	66.4	−1.1
Sodium metasilicate	80.8	77.0	−3.8
Trisodium phosphate	73.9	73.4	−0.5
Sodium carbonate	60.8	66.4	+5.6
Modified soda	60.8	57.6	−3.2

of such agents with soap is probably the greatest advance in detergency in the present century. In their presence, hard water acts like soft water, foams readily, gives no precipitate of soap curds. Thus they reduce the foreign matter to be removed by preventing precipitation of the heavy metal soaps. In hard water districts, half the soap is used as water softener, then the precipitate as formed has to be washed away as part of the foreign matter.

For washing of glass or glass-lined equipment, soap is objectionable. An adsorbed layer on the glass surface just will not wash off completely. This is as important for food packers as for large users of glasses or for window washers, the technic of each recognizing the fact. Therefore, relatively effective alkaline cleaners without soap are used if sterilization is not involved and usually some caustic soda if the item must be sterile.

For food products, use of alkaline cleaners is not objectionable and therefore synthetic detergents of sulphated or sulphonated structures have made but little headway in that field. Undoubtedly, desirable applications will be found in the future, particularly as some of that type of detergents will eventually sell at prices competitive with soap. But some of them possess many of the undesirable as well as the desirable properties of soap.

Speaking of the use of detergents in the food products industry, a trade journal recently mentioned the use of sodium metasilicate on fish. Purpose —to reduce the odor. That would be the last word in detergency.

Too Many Accidents In Food Plants

Accident frequency rate one-eighth higher than for all industries, though severity rate is lower. The cures for this high frequency rate are indicated by the causes, which are outlined in this article.

TOO many accidents happen in the food industries. But fortunately, the mishaps do not injure workers as seriously, on the average, as the accidents in industry in general. Here's how National Safety Council puts it: The industry's frequency rate is one-eighth higher than the average for all industries, being 14.04 reportable injuries per million hours worked in 1940. But the severity rate is just two-thirds that for American industry as a whole.

The food industry's big safety problem, then, is to eliminate more of the minor accident hazards—of which there are many because of the nature of food plant operations. Plant managers and foremen ought to put more guards on machines and conveyors, take more precautions in regard to floors, ladders and other working surfaces and provide employees with safer hand tools. Then they ought to teach more safety to employees. This is true especially in the smaller plants.

But let's take a look at National Safety Council's record of the accident causes in the industry, since to apply the cure you must know the cause.

Agencies of Injury

One third of all injuries involved machinery, particularly rolls, mixing machines, fans and centrifugals. Trucks, railroad cars and other types of vehicles figured in one-seventh of the accidents and were next in importance. Other types of equipment often involved in accidents were floors, ladders and other working surfaces; conveyors; ovens, furnaces and similar equipment; hand tools, hoisting apparatus; and belts and other power-transmission apparatus.

Types of Serious Accidents

One-half of the injured employees got their fingers or other members of the body caught in or between moving parts of equipment. Falling, sliding and flying objects resulted in 25 percent of the injuries. Accidents occurred particularly when employees were cleaning, repairing, adjusting and performing similar duties in the operation of equipment.

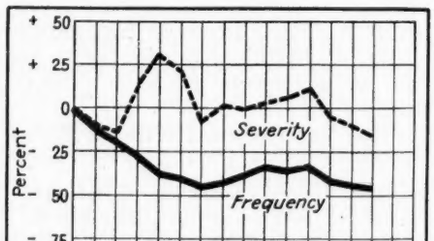
Unsafe Acts by Employees

Workers often invite injury while working in the plant, and it will always be the job of management to caution them of specific dangers, make them accident conscious and train them to avoid danger. Here are the principal unsafe acts involved in accidents reported to National Safety Council during the past four years: (1) Working on machinery in motion. (2) Gripping insecurely, taking the wrong hold, lifting improperly and otherwise handling materials and equipment unsafely. (3) Assuming unsafe positions, such as standing on a table equipped with rollers. (4) Putting hands, feet or head into openings or entering areas that are unsafe, such as taking hold of a cable just ahead of a sheave or walking on railroad tracks. (5) Unsafe use of machinery, tools and equipment, such as using defective machinery, the wrong tool for the job, and using hands instead of tools. (6) Starting, stopping or otherwise operating equipment without authority or without giving or getting the proper signal.

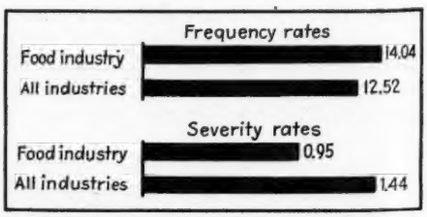
Mechanical Causes

Although employee causes were the more important, unsafe conditions did figure in 80 percent of the injuries. The principal mechanical cause of serious injuries was unsafe working methods, processes, layout and poor plant housekeeping.

Lack of adequate guarding figured in one-fourth of the injuries. Several accidents resulted from loose covers on machines and conveyors.



Trends in accident frequency and severity rates in the food industry since 1926. The curves are headed in the right direction after several years of misbehavior. They show percentage changes in the accident rates.



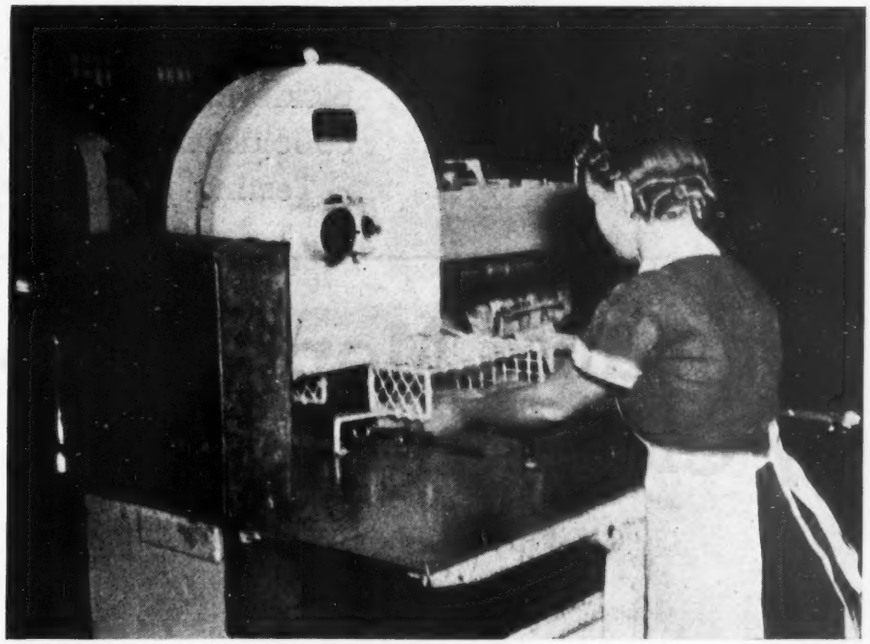
How the accident severity and frequency rates in the food industry compare with those in industry in general.

Defective equipment, particularly in design, was also important in the occurrence of accidents. For example, a packer had two fingers amputated in performing a duty which required the removal of a pan from the inside of a packing machine. The pan was relocated, not only eliminating the hazard, but increasing the efficiency.

Failure of employees to use safety shoes, goggles and other protective equipment resulted in several injuries, as usual.

Personal Causes

Personal causes, like unsafe acts by employees, need constant attention and a continuing program designed to make workers accident conscious and therefore cautious. One-half of the personal causes of serious accidents were disobedience, abstraction, haste and other improper attitudes. Next in importance were lack of knowledge of safe practices, inexperience and lack of skill on the part of employees. Take, for instance, the case of the new employee who was buried and suffocated in a slide of cottonseed because he did not know how to keep the pile properly trimmed.



Danger of injury on this machine has been removed by a simple, inexpensive guard. This is a Continental Baking Co. plant. More of this type of accident prevention is needed in the food industries, especially in small plants, accident data show.

Relative Importance Of Types of Accident.

Type of accident	No. of injuries
Total	231
Caught in or between	122
Falling, sliding and flying objects	57
Burning and scalding	13
Falls from one level to another	12
Striking against	11
All others	16

Relative Importance Of Agencies of Injury.

Agencies	No. of injuries
Total	231
Machinery	77
Trucks, railroad cars and other vehicles	30
Floors, ladders and other working surfaces	16
Conveyors	15
Ovens, furnaces, and pressure apparatus	14
Hand tools	13
Elevators and hoisting apparatus	12
Mechanical power—transmission apparatus	11
All others	43

Who Did Best Job

Perhaps because of more extensive safety programs, large plants in the food industry had the lowest 1940 accident frequency rate (13.72). The severity rate, however, was lower in small plants (0.89). But credit for improving safety in the food industry as a whole during 1940 is given by National Safety Council to the large plants which cut frequency 6 percent and severity 13 percent from 1939.

Cereal manufacturers had the lowest frequency rates in the industry. (5.12), while sugar refineries had the highest rate (25.07).

Grain elevators had the lowest severity rate (0.38), and corn processing plants the highest (1.81). Candy manufacturers made the most improvement during 1940, reducing frequency 29 percent and severity 55 percent.

The Peter Cailler Kohler Swiss Chocolate Co., Inc., Fulton, N. Y., continues to hold the all-time no-injury record in the industry with 3,904,841 man-hours.

Food companies which made outstanding safety achievements during 1940 were listed by National Safety Council as follows:

General Mills, Inc., Canadian Postum Co., Ltd., National Biscuit Co., Corn Products Refining Co., Clinton Co., Ralston-Purina Co., New England Confectionery Co., Bennett-Hubbard Candy Co., Kraft Cheese Co., Breyer Ice Cream Co., Borden Co., Producers Milk Co., Bowman Dairy Co., Falstaff Brewing Corp., Revere Sugar Refining Co., Spreckels Sugar Refinery, Atlantic Sugar Refineries, Ltd., I. J. Grass Noodle Co. and Salada Tea Co.

Disabling Injuries in 1940, by Industrial Groups.

Industrial group	Number of industrial units	Man-hours worked (thousands)	Average number of employees	Number of disabling injuries				Time charges				Injury rates	
				Death and perm. total	Perm. partial	Temporary total	Total	Death and perm. total	Perm. partial	Temporary total	Total	Frequency	Severity
All Groups	622	269,593	152,298	13	241	3,539	3,784	78,000	108,668	69,697	256,365	14.04	0.95
Cereal manufacturing	11	9,568	4,718	0	5	44	49	0	4,350	1,856	6,206	5.12	0.65
Bakeries	87	34,322	16,256	1	23	326	350	6,000	7,499	5,924	19,423	10.20	0.57
Corn products	10	16,367	6,897	2	23	151	176	12,000	13,930	3,713	29,643	10.75	1.81
Milling	59	12,673	6,070	2	10	143	155	12,000	4,810	3,273	20,083	12.23	1.58
Confectionery	13	9,314	5,399	0	4	115	119	0	1,200	4,427	5,627	12.78	0.60
Canning and preserving	171	20,776	32,192	2	23	362	387	12,000	13,021	7,894	32,915	18.63	1.58
Dairy products	83	46,798	27,247	0	105	789	894	0	49,413	17,506	66,919	19.10	1.43
Beverages	21	12,919	6,763	1	7	254	262	6,000	1,595	3,172	10,767	20.28	0.83
Grain elevators	18	1,909	879	0	1	44	45	0	90	637	727	23.57	0.38
Sugar refining	13	15,395	7,131	1	35	350	386	6,000	11,518	6,228	23,746	25.07	1.54
Other food products	28	16,354	9,131	2	5	267	274	12,000	1,242	3,395	16,637	16.75	1.02

QUALITY CONTROL

Removing lead from sirup • Effect of sugar in pickle fermentation • What you can do with colloidal stabilizers • Digest of AMS standards • Testing paprika by color method

Deleading Maple Sirup By Clarification

By C. J. TRESSLER and W. I. ZIMMERMAN
New York State Agricultural Experiment Station, Geneva, N. Y.

Contamination of maple products with lead could be avoided, but will likely go on, as farmers will undoubtedly continue the use of terneplate or white lead painted sap buckets and of soldered evaporators. Therefore, this discussion of lead removal is doubly timely.

IN the maple sirup industry it has long been stressed that a producer will profit by clarifying his sirup by means of felt filters[1] and clarifying agents[2, 3] such as milk or small amounts of egg white.

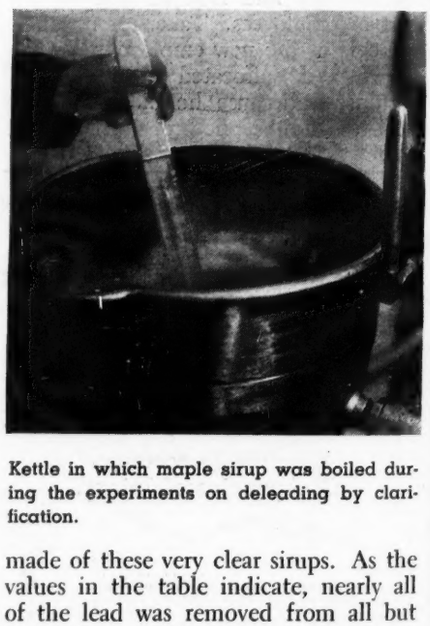
The importance of clarification as a means of removing lead has never been fully emphasized, because nearly all of the past work on deleading was done on sirup that had already been partially clarified by settling or filtering. Consequently, not all the lead originally present in the sap was in the sirup being studied. Conlin[4] mentions that filtration will remove some lead, but that the amount removed is variable. Willets and Tressler[5] showed the effectiveness of milk for deleading maple sirup and recommended its addition before boiling the sap to sirup. This work has been extended, and in the 1940 sirup season a more complete record of the lead removed by the various forms of clarification was obtained. To do this, samples of lead-containing sap were boiled down in a stainless steel kettle and the resulting sirup along with all the precipitate of "sugar sand" was bottled and sealed. The sirup samples thus obtained were then analyzed for total lead content, which included the lead held by the sugar sand.

In another set of samples, sirup was collected directly from a lead-soldered evaporator into bottles and sealed. The method of analysis for the lead determinations, a modified dithizone colorimetric method developed by Willits, Norton and Tressler[6], was used. In order to insure complete dispersion of the sugar sand throughout the sirup before taking a sample for analysis, the sealed bottles of sirup were heated to over 70 deg. C. and then well shaken. Since samples were immediately withdrawn and weighed, there was no chance for any settling, and a homogeneous sample was obtained. The bottles of sirup were then sealed, sterilized and set aside to let the precipitate settle. Lead analyses of the samples taken with the sugar sand ran as high as 10.8 parts per million and are compiled in Table I.

After the same bottled samples of sirup had been allowed to stand for a month, most of them appeared quite clear and samples of the clear sirup were withdrawn without disturbing the sediment and lead determinations made on these samples. Some of the samples showed a little cloudiness, and in some of the bottles there was a layer of foreign material on the surface. In these it was impossible to obtain an entirely clear sample and the lead contents were greater than in the average settled samples of sirup, which showed very low amounts. The results of the lead analysis are summarized in Table I.

Cold Filtering

In order to remove the maximum amount of precipitate, a sample of sirup from each bottle was cold-filtered through filter paper. After about two days, when enough sirup for analysis had filtered, lead determinations were made of these very clear sirups. As the values in the table indicate, nearly all of the lead was removed from all but six of the samples. In these six sirups, the precipitate was of a colloidal nature so that it gave a noticeable turbidity to the filtered sirups. This suspended material could not be removed by centrifuging.



Kettle in which maple sirup was boiled during the experiments on deleading by clarification.

Hot Filtering

In order more nearly to duplicate the filtration as it is commonly carried out by the maple producer, the sealed bottles of sirup were heated in boiling water for an hour, removed, opened and samples of hot-filtered sirup obtained and analyzed for their respective lead contents. In the average case, the lead content was found to be just slightly higher than when the sirups were cold-filtered. In some instances, the lead content of the hot-filtered samples was

found to be lower than that of the same sirups when cold-filtered. It was thought that the heating might be coagulating any colloidal material present so that it was being removed by filtration.

In order to find out if this were true, a number of the sirups were sealed and autoclaved under a 15-lb. steam pressure for three hours and then the lead content determined on a hot-filtered portion of each sample. In all cases, the lead content had been raised rather than lowered so the experiment failed to show any coagulation of colloidal material. It may be that the treatment was too vigorous, since all samples of autoclaved sirup showed much caramelization and this decomposition of the sugar may have had something to do with the odd results obtained. On the other hand, the lead may be held in the precipitate as a co-precipitated material or by absorption on the very fine calcium malate, so that at the higher temperature in the autoclave some of the lead was released and remained in solution.

TABLE I—Parts Per Million of Lead.

Sample	Source of lead	Stirred sample	Settled sample	Cold-filtered sample	Hot filtered sample	Autoclaved and hot-filtered sample	1 percent dried-milk treatment
3–20 Red	Terne-plate buckets	4.9	0.9	0.1	0.6	....	....
3–29 Red		5.7	0.5	0.2	0.5	2.7	....
4–2 Red		2.8	0.3	0.1	0.3	1.6	....
4–5 Red		2.7	1.3	0.3	0.2	....	....
4–8 Red		4.4	0.5	0.1	0.1	....	....
4–11 Red		2.6	1.0	0.3	0.2	....	....
4–16 Red		4.3	0.4	0.1	0.1	....	....
4–22 Red		9.5	1.8	1.3	1.2	....	0.6
3–20 White	White lead painted buckets	4.3	1.7	0.2	0.6	....	....
3–29 White		3.8	0.6	0.0	0.1	....	....
4–2 White		2.4	0.5	0.1	0.2	....	....
4–5 White		3.6	0.2	0.1	0.2	....	....
4–8 White		6.4	0.6	0.1	0.4	....	....
4–11 White		5.1	1.9	0.9	1.0	....	....
4–16 White		6.4	1.0	0.2	0.4	....	....
4–22 White		10.8	3.8	2.3	2.6	....	0.8
3–20 Blue	Terne-plate spouts	0.9	0.1	....	....	....	....
3–29 Blue		1.4	0.4	....	....	....	....
4–2 Blue		0.9	0.0	....	....	....	....
4–4 Blue		1.4	0.0	....	....	....	....
4–8 Blue		1.6	0.1	....	....	0.8	....
4–11 Blue		2.4	0.3	....	....	1.1	....
4–16 Blue		1.3	0.0	....	....	0.6	....
4–22 Blue		4.0	0.7	....	....	0.8	....
3–20 Black	Lead-free paint over terne-plate buckets	0.7	....	0.0	0.1	....	....
3–29 Black		2.1	....	0.1	0.2	....	....
4–2 Black		0.1	....	0.0	0.2	....	....
4–4 Black		0.8	....	0.1	0.1	....	....
4–8 Black		2.0	....	0.0	0.2	....	....
4–11 Black		1.5	....	0.4	0.5	....	....
4–16 Black		1.6	....	0.0	0.0	....	....
4–22 Black		1.8	....	0.6	0.7	....	....
3–20	Lead-soldered evaporator	8.4	3.6	....	....	....	0.4
3–29		9.8	1.3	....	....	....	0.2
4–3		2.2	0.1	....	....	....	....
4–12		7.5	0.6	....	....	....	....
4–17		6.4	0.6	....	....	....	....

Milk for Clarifying

By using milk for clarification of sirups containing very high amounts of lead, a great deal of the lead is removed. Whether the milk helps coagulate the precipitate which otherwise might go through the filter, or whether the lead unites with the phosphates present in milk to produce insoluble lead phosphate is not known, but undoubtedly there is lead removal by both actions. In our experiments only those samples which showed over one part per million of lead after being hot-filtered were used for testing the efficiency of milk for deleading.

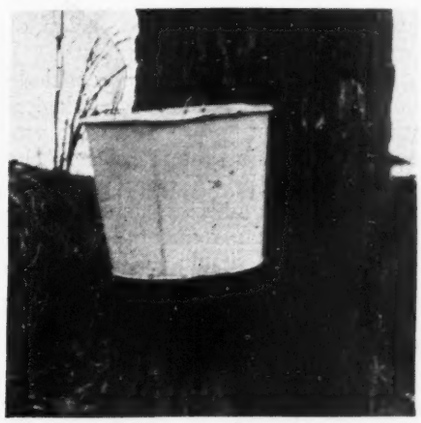
It was thought that little would be gained in treating sirups with milk when ordinary hot-filtering removed almost all of the lead; in other words, that the increased removal of lead brought about by using milk would not be very pronounced. In these tests samples were taken from the original bottles of sirup containing full proportions of dispersed sugar sand and these samples then boiled with 1 per cent of dried skim milk and 10 per cent of water until they were reduced to sirup density and then hot-filtered. Samples treated in this fashion showed very much greater reductions in lead than the same samples which had been simply hot-filtered.

TABLE II—Effect of Dilution.

Sample	Treatment	Degrees Brix.	Parts per million of lead
A	Heated and stirred	68.5	2.3
B	Heated and filtered	68.5	0.8
C	Diluted, heated and filtered	66.2	0.9
D	Diluted, heated and filtered	63.5	0.8
E	Diluted, heated and filtered	61.0	0.8

One other experiment was conducted to determine if the solubility of lead increased upon dilution of a sirup. A lead-containing sirup of density 68.5 deg. Brix was heated and stirred, a sample was removed for lead analysis, some of it was then hot-filtered, and then the original sirup was diluted a bit, shaken and hot-filtered, and then the density taken of this sample. The process of diluting was repeated twice again and then the lead content determined on all the samples. These results are compiled in Table II and show that, even though a sirup may be quite low in density (sirups as low as 61 per cent of sugar are seldom found commercially), the dilution does not alter the change of lead content upon filtering.

The question has been raised concerning the possibility of flavor changes occurring in maple sirup due to the treatments just described. In all the samples tested, no noticeable change in flavor could be detected. But there was a slight decrease in color intensity of the sirups after treatment with milk.



Principal sources of lead contamination of maple sap are such sap buckets as these: Left, terneplate bucket; right, bucket painted with white lead paint.

Summary

1. Clarification of lead-containing maple sirups will remove very large amounts of the lead present. Sirups clarified by letting the precipitates set-

(*Turn to page 85*)

Influence of Sugar Addition to Brines In Pickle Fermentation

By M. K. VELDHUIS and J. L. ETCHELLS

Food Research Division, Bureau of Agricultural Chemistry and Engineering U. S. Department of Agriculture, Raleigh, N. C., and

I. D. JONES and OTTO VEERHOFF

Department of Horticulture, North Carolina Agricultural Experiment Station, Raleigh, N. C.

PART I—This paper*† summarizes a series of tests that show that the addition of sugar to brines in the manufacture of salt stock or dill pickles not only fails to increase the acidity of the brines to a useful degree, but also leads to an increase in the proportion of bloaters in the stock.

IN the fermentation which takes place during the curing of salt stock or dills the fermentable carbohydrates of the cucumbers, largely reducing sugars, are almost completely converted into organic acids and certain other products of fermentation. The principal acid formed is lactic. Most commercial manufacturers consider that the development of an appreciable brine acidity is not only desirable but essential for the satisfactory curing of cucumbers and the subsequent storage of the stock produced.

Furthermore, it is the opinion of many that acid formation should start promptly after the beginning of the brining process and should take place at a rapid rate.

Several investigators have suggested the addition of sugar to brines in the manufacture of salt stock or dills, in order to accelerate acid formation or to favor the production of a greater quantity of acid. This latter effect was considered particularly desirable in the case of the brining of cucumbers, which possess a relatively low sugar content.

The idea of adding sugar to fermenting pickle brines is by no means new. In 1899 Aderhold recommended the addition of 0.05 or 0.10 percent of dextrose to the brine and claimed that acid formation took place at a more rapid rate and that more acid was produced when sugar was added.

LeFevre reported that by adding a fermentable sugar (corn sugar and molasses were used) at the beginning of the salting process "a more speedy onset of fermentation took place and a higher acidity was developed."

Joslyn stated that the addition of dextrose to dill pickles decreased spoilage by increasing the rate of acid production. He also reported a slight increase in the quantity of acid produced. Joslyn suggested the addition of 5 lb. of dextrose per barrel of cucumbers.

Fabian and Wickerham conclude from a biochemical and bacteriological study of the curing process in the production of genuine dill pickles that "the addition of 2 lb. of sugar per barrel increases the number of bacteria at the beginning of the fermentation. This is considered desirable since it insures a more rapid production of acid."

Fabian considered the addition of sugar to fermenting dill brines advisable as a protective measure against spoilage and states that it insures an adequate supply of sugar for all organisms.

Fellers, Miller and Onsdorf reported the addition of dextrose to cucumbers and sweet green peppers before the beginning of the fermentation. They state that the "addition of dextrose in the rates of 1 to 2 percent of the weight of the vegetable materially increased the titratable acid, reduced spoilage and improved keeping quality and texture." They further stated that "the added dextrose serves to accelerate the fermentation as well as produces a much greater quantity of lactic acid due to stimulation of lactobacilli by readily available sugar."

Campbell advised the addition of from 1 to 2 percent of glucose or any other cheap fermentable sugar when making up brine to be used in the curing of salt stock if it were desired to produce a higher percentage of acid than normally occurs.

All the reports of previous investigators are unanimous in claiming that the use of sugars in advantageous.

Problems and Methods

During the past few years several experiments on the addition of sugars to fermenting cucumber brines have been conducted in Eastern North Carolina. These studies were made in connection with salt stock formation and dill pickle production during four different seasons.

The cucumbers used were found by analysis to contain approximately 2.1 percent of sugar. The lots to which sugar was added received a quantity equal to or greater than 1.75 percent of the total weight of the fresh cucumbers employed in these studies.

This quantity represented a supplementary addition of sugar equal to or greater than 80 percent of the quantity introduced by the fresh cucumbers. On this basis a distinct increase in brine acidity might be expected following the

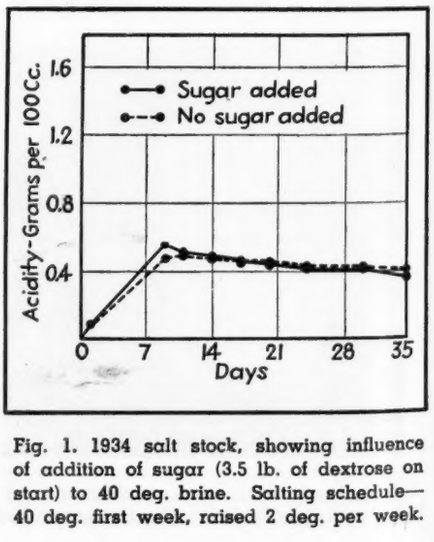


Fig. 1. 1934 salt stock, showing influence of addition of sugar (3.5 lb. of dextrose on start) to 40 deg. brine. Salting schedule—40 deg. first week, raised 2 deg. per week.

* N. C. Agricultural Experiment Station Technical Paper No. 116. Food Research Unit Contribution No. 2.

† This paper was read before the Technical School of Pickle and Kraut Packers at Michigan State College.

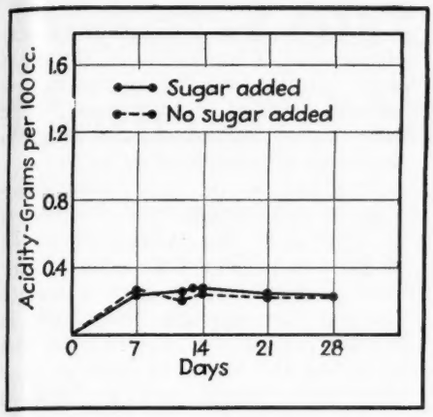


Fig. 2. 1939 salt stock, showing influence of addition of sugar (3.5 lb. of dextrose on eleventh day) to 40 deg. brine. Salting schedule—40 deg. first week, raised 2 deg. per week.

addition of sugar to the brine if the supplementary sugar is converted into acid with the same efficiency as the sugar introduced by the green fruit.

In the salt stock experiments the cucumbers were cured in barrels (3 bu. lots) and in a vat (85 bu. lot). These containers were fitted with false heads. They were kept outside, and therefore, there was no growth of scum on the surface of the brine. All the dill experiments were conducted in barrels which were headed and loosely bunged during the fermentation period. The detailed procedure following in the dill experiments has been previously outlined.

In this study all experiments conducted in barrels were carried out in duplicate. So all values reported are the average of two observations.

The chemical analyses which were made included observations on changes in concentration of the titratable acidity and the reducing sugars of the brine during the curing period. In presenting the data, titratable acidity has been expressed as grams of lactic acid per 100 c.c. of brine.

The methods followed in the chemical and bacteriological analyses have been previously reported.

Experimental Results

A graphical presentation of a portion of the data obtained in these studies follows:

In Fig. 1 are shown the results of adding 6 lb. of sugar (sucrose) per barrel at the start, in the production of salt stock cured according to a 40 deg. schedule as compared to a check 40 deg. treatment receiving no sugar. Four barrels were started on the same date with cucumbers (2,400 count size*) which were similar so far as appearance was concerned. The salting procedure followed for all barrels was the same with the exception that one pair received 6 lb. of sugar per barrel (designated as sugar-added lot) and the other two barrels received no sugar (designated as no-sugar-added lot). It is evident from Fig. 1 that no significant differences in brine acidity were observed between the treatments outlined in spite of the fact that in the sugar-added lots the total available sugar content exceeded that of the no-sugar-added lots by more than 100 percent.

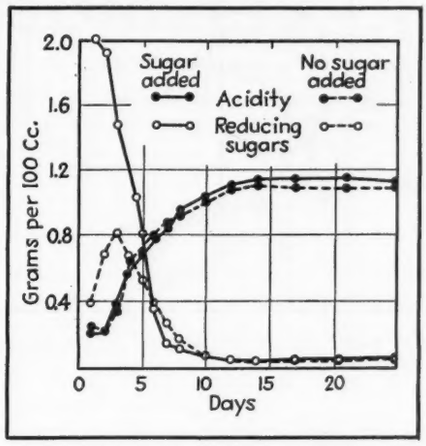


Fig. 3. 1937 dills, showing influence of addition of sugar (3.5 lb. of sucrose at start) to dill brine containing 0.5 gal. of 110 grain vinegar.

The addition of sugar to fermenting brines in the production of salt stock was repeated in 1939 under somewhat different conditions. In this experiment the fruit was of the 800 and 1000 sizes (numbers per 45 gal. cask.) The entire lot of cucumbers required to fill four barrels were thoroughly mixed before placing in the barrels in order to assure uniformity of the fresh stock. The barrels received a uniform salting treatment (40 deg. schedule) for eleven days. At this time the partially cured cucumbers were thoroughly mixed by distributing the stock from each of the four original barrels into four new barrels, four cucumbers at a time. The brine used to cover the new set of barrels was that taken from the original barrels after thorough mixing. These precautions were taken to be certain that the cucumbers and brine in any given barrel were similar to those in any other barrel. One pair of barrels was followed as a check and to each of the other pairs was added 3.5 lb. of dextrose. Otherwise the treatment of all lots was exactly the same. Figure 2 indicates the differences in brine acidity which were observed following these treatments. No significance is attached to the slight differences observed in this experiment.

A series of observations were made on the influence of the addition of

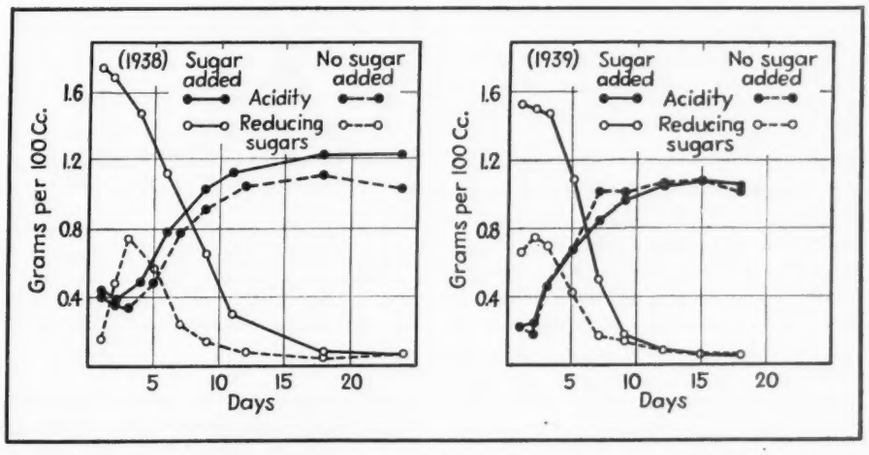


Fig. 4. 1938 dills, showing influence of addition of sugar (3.5 lb. of dextrose at start) to dill brine containing 0.5 gal. of 110 grain vinegar.

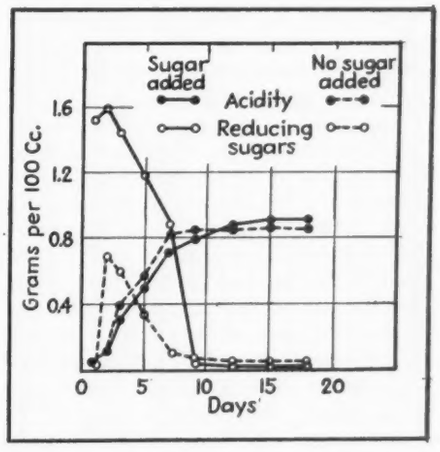


Fig. 5. 1939 dills, showing influence of addition of sugar (3.5 lb. of dextrose at start) to dill brines to which no sugar was added.

* Number per 45 gallon cask.

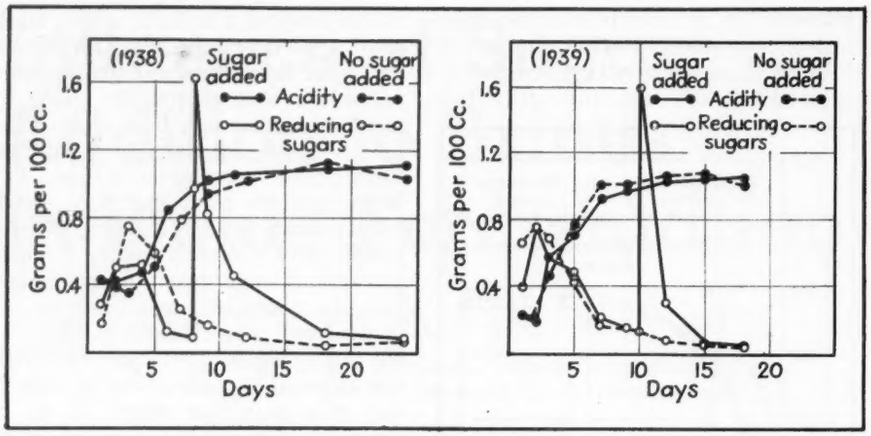


Fig. 6. Curves showing influence of addition of sugar (3.5 lb. of dextrose) to dill brines on seventh and tenth days.

sugar to dill brines at different periods of the fermentation process. The results obtained are graphically presented in Figs. 3 to 7, inclusive. Curves indicating changes in brine sugar concentration for the various experimental treatments are shown in addition to the brine acidity curves.

In the normal salting of cucumbers two processes occur which alter the sugar concentration in the brine during the curing period. The first process is the leaching of the naturally occurring sugar from the cucumber into the brine. The second is the utilization of sugar from the brine by microorganisms after the fermentation begins. Accordingly, a curve representing changes in sugar concentration in dill brines to which no sugar has been added will show a fairly rapid increase in sugar content for approximately three days and then a correspondingly rapid decrease caused by the utilization of sugar in the fermentation.

The curves for brine sugar concentration in brines to which sugar has been added are somewhat different in shape. In this case the concentration is high at the time the sugar is added but decreases very rapidly as a result of the dilution of the brine with water withdrawn from the cucumber and of the utilization of the sugar by microorganisms after fermentation begins.

Figures 3, 4 and 5 present the results of experiments made in 1937, 1938, and 1939. In these experiments sugar was added at the rate of 3.5 lb. per barrel to each of two barrels at the beginning of the curing period and two comparable barrels to which no sugar was added were followed as check or control lots. The sugar curves indicate that the sugar concentration was reduced at a very much more rapid rate in the brines to which sugar was added than in the brines of the no-

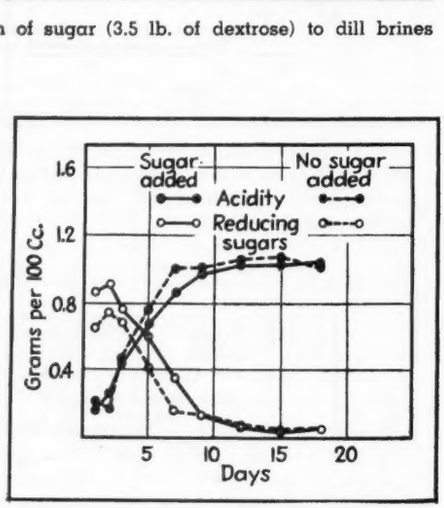


Fig. 7. 1939 dills, showing influence of addition of sugar (0.7 lb.—initially and on the fourth, sixth, eighth and tenth days) to dill brines containing 0.5 gal. of 110 grain vinegar.

sugar-added lots. In spite of this more rapid sugar utilization, only slight differences were observed in the rate of acid production or in the final acidity developed in the brine of lots receiving the two different treatments. As will be emphasized later these differences were too small or too irregular to be considered significant.

Experiments on the effect of the addition of the sugar to the brine after the acid formation had become well started have been made. The results of these studies are presented in Fig. 6. The values shown in the 1938 graph may be considered by some to indicate that the addition of sugar accelerates acid formation. It should be borne in mind, however, that in this case the sugar was not added until the seventh day and the greatest difference in the acidity of the brines for the lots receiving the given treatments was observed prior to this date. Furthermore, no greater differences in acidity between the sugar and no sugar treatments developed following the addition of this appreciable quantity of sugar.

The 1939 graph indicates the results obtained in a repetition of the 1938 study. In this case, the differences were actually reversed. Accordingly, little or no significance can be attributed to the small differences observed.

Inasmuch as no appreciable difference in brine acidity was observed to be induced by the addition of 3.5 lb. of sugar at a given time either at the start or after 7 or 10 days, it seemed desirable to approach this study in another manner. It was thought that by adding the 3.5 lb. of sugar in small quantities at intervals over an extended period of time, the added sugar might be converted more efficiently into acid, thereby resulting in the formation of an increased quantity of acid. Accordingly, in 1939 the effect of a more gradual addition of 3.5 lb. of sugar per barrel was tested. To each of the sugar-added barrels was added 0.7 lb. of dextrose at the start and on the 4th, 6th, 8th and 10th days after starting. The analyses of brines from this treatment are given in Fig. 7 and show that such a method of adding sugar resulted in the maintenance of a somewhat higher concentration of sugar in the brine for the first nine days. In spite of this, the acidity curve for this treatment at no time prior to the eighteenth day even equaled that of the treatment receiving no added sugar.

NOTE: *Part II of this article will appear in the November, 1941, number of* FOOD INDUSTRIES.

References

1. R. Alderhold. Untersuchungen uber das Einsauern von Fruchten und Gemusen, Part II, *Cent. fur Bakt*, Vol. 5, 511-514, 1899.
2. C. H. Campbell, Outdoor Season Booms Pickle Volume, *Canning Age*, Vol. 18, 221-224, 228-229, 232, 1937.
3. F. W. Fabian. Some Important Factors Influencing the Fermentation of Dill Pickles, *Fruit Products Journal*, Vol. 17, 240, 1937.
4. F. W. Fabian and L. J. Wickerham, Experimental Work on Cucumber Fermentation, Part VIII, *Technical Bulletin* 146, Michigan Agricultural Experiment Station, 1935.
5. C. R. Fellers, J. Miller and T. Onsdorf. Dextrose in the Manufacture of Fruit and Vegetable Products, *Industrial and Engineering Chemistry*, Vol. 29, 946-949, 1937.
6. M. A. Joslyn. Some Observations on the Softening of Dill Pickles, *Fruit Products Journal*, Vol. 8, No. 8, 19-29, 1929.
7. M. A. Joslyn. Some Observations on the Softening of Dill Pickles, *Fruit Products Journal*, Vol. 8, No. 9, 16, 17, 21, 1929.
8. E. LeFevre. Pickle Processing Investigations, *The Canner*, Vol. 50, 230-232, 1920.
9. E. LeFevre. Bacteriology of Sauerkraut and Pickles. *Chemical Age*, Vol. 30, 34, 1922.
10. I. D. Jones, M. K. Veldhuis, J. L. Etchells and Otto Veerhoff. Chemical and Bacteriological Changes in Dill Pickle Brines During Fermentation, *Food Research*, Vol. 5, 533-547, 1940.
11. Unpublished data.

What You Can Do With Colloidal Stabilizers

By W. C. COLE
Division of Dairy Industry,
University of California, Davis, Calif.

PART II * — Here are presented some of the facts about the kinds and combinations of stabilizers that can be used to the best advantage in improving the quality of processed foods.

IN many industries, foam is undesirable, but the incorporation of air, which constitutes the gaseous component of the dispersed ingredient in making certain types of foam, is a necessity in the manufacture of ice cream. Here many factors influence the amount of air that can be incorporated, also the ease with which the desirable amount of air can be properly distributed. The mix composition with respect to its major components has some effect upon the whipability, but ordinarily the addition of relatively small amounts (0.5 percent ±) of egg-yolk solids coupled with control of processing and freezing will suffice to control air incorporation (commonly called overrun). At present continuous freezers are used to meter both mix and air into the freezing chamber, thus assuring a uniform product so far as overrun is concerned.

Besides the incorporation of air into ice cream during the freezing process, the system should be stable. This is not always the case. At certain seasons and under certain conditions of storage and delivery, the ice cream may draw away from the sides of the container and may also settle. This, known as shrinkage, has been the subject of a recent brief review (6). Several factors influence the problem. The accompanying illustrations show some samples in which shrinkage has occurred.

With whipped cream, air incorporation is also important. Although many factors affect this phenomenon, it differs from air incorporation in ice cream in that the whipped cream is stabilized after the air is incorporated by the formation of large clumps or clusters of fat globules. If this process continues too long, churning occurs, giving rise to butter granules.

Stabilizers for Ice Cream and Related Products

Stabilizers are almost universally used in manufacturing ice cream, although in certain localities, through religious prejudice, ice cream is manufactured without them (5). Gelatine is used to the greatest extent, although sodium alginate is also employed rather extensively. Various gums, pectin, and agar are sometimes used; but the latter are more generally employed in the manufacture of water ices and sherbets.

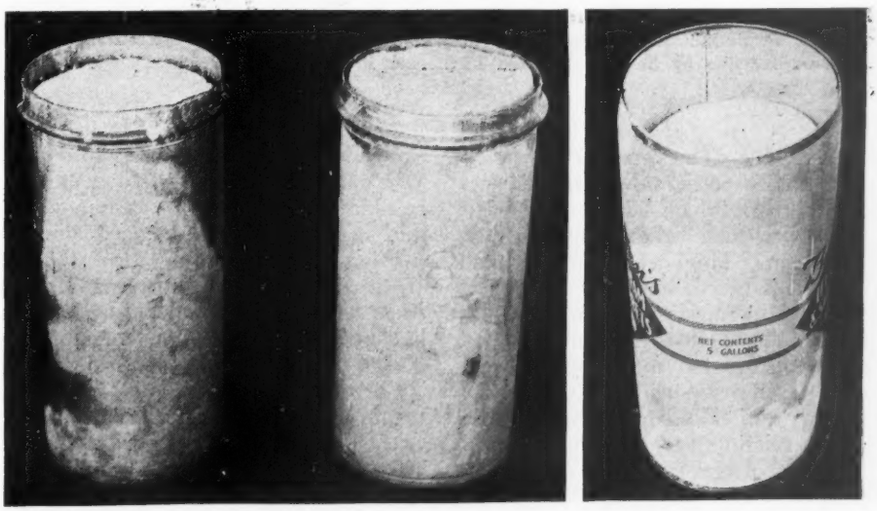
Although these products may act as emulsifying agents, they are added primarily to retard ice-crystal growth, thus aiding in maintaining smooth-textured products. Ice cream is seldom completely frozen. The ice in it, consequently, will melt if the temperature is raised; and the water in it will freeze if the temperature is lowered. Ice cream is subjected, during storage and delivery, to temperature fluctuations that tend to produce a coarse-textured product. As a result of alternate melting and freezing, small ice crystals tend to disappear, and the large crystals to grow. Stabilizers retard the growth of ice crystals sufficiently so that by observing other accepted procedures in freezing, hardening, and storage, one may keep ice crystals below the objectionable size.

When used in the correct concentration, the stabilizers help to maintain but do not always insure smooth-textured finished products. If used in excess they may cause a heavy body, and the ice cream may be sticky, gummy, or non-refreshing; whereas, if they are used in insufficient concentration, the ice cream may be weak-bodied, unduly coarse, or icy. The results in the accompanying table were obtained by the author a number of years ago. There is a fairly good agreement between ice-crystal size and the texture of ice cream judged organoleptically. None of the samples containing stabilizers was as coarse in texture as the sample without added stabilizer.

In ice cream we seldom have sufficient migration of the unfrozen portion from top to bottom of the container to

The Effect of Stabilizers on the Texture of Ice Cream

Sample	Stabilizer used		Ice-crystal size, mm.	Remarks as result of organoleptic test for ice cream texture
	Kind	Concentration percent		
1E		None	0.13 x 0.13	Very coarse
2E	A	0.35	0.11 x 0.10	Coarse
3E	B	0.20	0.07 x 0.12	Slightly coarse
4E	C	0.20	0.08 x 0.11	Slightly coarse
5E	D	0.30	0.06 x 0.10	Fairly smooth
6E	E	0.25	0.07 x 0.11	Slightly coarse
7E	F	0.25	0.04 x 0.05	Smooth



Samples of ice cream subjected to variation in pressure and showing different degrees of shrinkage.

* Part I of this article appeared in Food Industries, September, 1941.

A comparison of the effect of relative heat inactivation on the clearing pectic enzymes in oranges, grapefruit and lemons. The turbidity of the juice infers the enzymes are rendered inactive by heating. Heated from 1 to 10 minutes as shown by the figures at the top.

cause trouble. This separation is much more apt to occur, however, with ices and sherbets, which have higher sugar and lower total solids contents than ice cream. This defect in ices and sherbets is called "bleeding." The use of proper stabilizers will retard this flow sufficiently so that ices and sherbets can be distributed and dispensed without the development of the defect. Pectin is often used for this purpose, as are gelatine, agar and gums. Combinations of agar and gums or agar and gelatine have also given satisfactory results. Besides functioning in the capacity just mentioned, stabilizers in ices and sherbets are expected to retard ice-crystal growth, as with ice cream. In addition, they may play an important role in the overrun obtained during freezing.

In certain instances, substances in fruits or fruit products, used as sources of flavor, may precipitate the stabilizer added, thus destroying its effectiveness. This occurs when the juice from red grapes or wines made from such juice is used in ices containing gelatine. Obviously, therefore, gelatine is not a satisfactory stabilizer in such cases, though ordinarily it can be used.

In general, stabilizers are used in frozen fruits and vegetables. Recently, however, Baker (1, 2) has shown that beneficial results may follow if pectins are used in the prefreezing treatment of certain fruits. He reports (1) that low-methoxyl low-ash pectins are of definite value in the prefreezing of strawberries. The pectin forms a jelly with exuding juices which prevents oxidation, further loss of juice and changes of color and flavor. Best results were obtained when the strawberries were sliced before treatment with pectin or a mixture of sugar and pectin.

This author (2) also reports that with Elberta peaches low-methoxyl pectin did prevent loss of juice but detracted from the general appearance of the fruit.

High methoxyl pectins, on the other hand, aid in the formation of viscous sirups which cling to the exterior of the peach thus preventing oxidation.

Blanching or heating the products before freezing is often used to destroy enzymes that would otherwise cause undesirable changes during storage.

Jellies and Gel Formation

In the manufacture of jellies, jams, and related products, pectins are primarily responsible for gel formation. It is necessary, of course, to have the correct concentrations of sugar and acid along with the pectin to give the desired results. Other factors that also affect the nature of the gel will be given consideration.

Joslyn and Sedky (12) reviewing the nature of pectins, state: "The natural pectins are believed to consist of long, open, unbranched chains of galacturonic acid with an occasional arabinose and galactose molecule. The free carboxyl groups of the galacturonic acid are partially or wholly esterified with methyl alcohol, and an occasional hydroxyl group is esterified with acetic acid." It is also generally agreed that pectins differ from each other both in chemical composition and in degree of polymerization (10). According to Joseph (11) the molecular weight of pectin is in the order of 150,000 to 200,000. Furthermore, naturally occurring pectins are associated with gums and other accessory substances that may contribute to differences in the results obtained by using pectins from various sources. Certain gums, if present, tend to give sticky jellies, which are objectionable; but the presence of others may perhaps be beneficial.

With the foregoing information in mind, one sees that there are various grades of pectin. The jelly grade is determined by the amount of sugar that a unit weight of pectin will set to

a gel under stipulated conditions. As Myers and Baker (18) have shown, the viscosity of pectin solutions is a fairly good index of the jelly grade of the pectin up to a jelly grade of about 340, whereas beyond this value the relationship does not necessarily hold.

Olsen (19) has applied Kruyt's concept regarding agar-agar gels to pectin. According to this view, pectin exists in solution as negatively charged hydrated colloidal particles. The addition of acid to such a solution reduces the charge on the colloidal particles, thus decreasing their stability. If sugar is also added, it acts as a dehydrating agent, so that under the proper concentrations of sugar and acid, precipitation of pectin micelles occurs, which in turn is responsible for gelation. Olsen postulates that the so-called "optimum hydrogen-ion concentration" of jelly making may be varied by changes in time just as through changes in sugar concentration. As he showed experimentally, apple-pectin jellies prepared rapidly at 55 deg. C. have abnormally high jelly strengths in comparison with jellies prepared by the short-boil method. This fact would indicate that only a fraction of the true jelly strength is obtained in the usual methods of jelly manufacture.

Under commercial conditions jellies contain approximately 65 percent sugar, about 1 percent pectin, and from 0.5-1.0 percent acid. The jelly grade of the pectin as well as the strength of the acid used are taken into consideration as a basis of arriving at the optimum concentrations for best results.

Pectins are not usually supplied as free pectic acid because as such, they do not keep well. According to Olsen (20) pectins of commerce contain sufficient calcium or sodium ion or other ions so that the pH of a 1 percent solution is above pH 3. He states that for some purposes the pH may be as high as 3.7-3.8.

Methods of purifying pectins (10) are based upon (1) dissolving in alcohol or acetone of progressively lower concentration, which allows the precipitation of relatively pure pectins; and (2) methylation, which provides another way of separating pectins from gums because pectins are more readily esterified than are gums. Probably, by considering these factors, one may satisfactorily explain certain of the anomalies.

Summary

Colloidal stabilizers are frequently used in various branches of the food industry to prevent the occurrence of undesirable changes. In certain cases they need not be used, in others they may be optional and in still others they are practically indispensable.

Since the nature of the systems requiring stabilization varies considerably, it may be necessary not only to select carefully the stabilizing agent but also to regulate the method of processing as a means of securing the desired results. In some cases it is necessary to add stabilizing agents to a system; in others the problem may be solved by destroying or inactivating enzymes which would otherwise degrade substances already present that could act as stabilizing agents. In still other cases, though the physical properties of a system can be stabilized by the use of any one of several so-called "stabilizers," proper selection is necessary to avoid the occurrence of certain undesirable chemical changes. Then, again, one may prevent metallic colloidal precipitates by adding substances that avert the chemical changes responsible for the colloidal precipitate.

The problems of properly stabilizing various products in the food industry are obviously complicated. The solution of each problem entails careful consideration of the various contributing factors in each case. In addition it should be realized that food processing often necessitates the destabilization of certain systems as a means of facilitating plant operation and of saving material and time.

References

1. George L. Baker, Pectin as Aid in Freezing Fruits: Part I, *Food Industries*, January, 1940, pp. 55-57.
2. George L. Baker, Pectin as Aid in Freezing Fruits: Part II, *Food Industries*, February, 1940, pp. 56, 97.
5. W. C. Cole, The Status of Ice Cream Stabilizers, *Proceedings* 39th Annual Convention, International Association of Ice Cream Manufacturers, Vol. 2, October, 1939.
6. W. C. Cole, Factors Affecting Shrinkage, *Ice Cream Field*, October, 1940, pp. 30, 31, 60.
10. C. L. Hinton, Fruit Pectins, Their Chemical Behavior and Jellying Properties, "Food Investigation Special Report No. 48," Chemical Publishing Co., Inc., New York, N. Y., 1940.
11. G. H. Joseph, Some Physical and Chemical Properties of Pectin, *Bulletin* of the National Formulary Committee, October, 1940, pp. 18-19.
12. M. A. Joslyn and A. Sedky, The Relative Rates of Destruction of Pectins in Macerates of Various Citrus Fruits, *Plant Physiology* Vol. 15, 675-687, 1940.
13. M. A. Joslyn and A. Sedky, The Effect of Heating on the Clearing of Citrus Juices, *Food Research*, Vol. 5, 223-232, 1940.
18. Philip B. Myers and George L. Baker, Fruit Jellies, VIII. The Role of Pectin. 4. The Physico-chemical Properties of Pectin, University of Delaware Agricultural Experiment Station *Bulletin* 187 (*Tech. Bul.* 15), March, 1934.
19. Aksel G. Olsen, Pectin Studies III. General Theory of Pectin Jelly Formation, *Journal of Physical Chemistry*, Vol. 38, 919-930, 1934.
20. Aksel G. Olsen, Comments on the Monograph for Pectin, *Bulletin* National Formulary Committee, October, 1940.

Brief Summaries Of AMS Standards

For the convenience of those who control quality in the food industries, the following digests have been prepared of the standards issued by the Agricultural Marketing Service.

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Service of the U. S. Department of Agriculture are prepared by FOOD INDUSTRIES. Those published in the August and September issues and those that follow continue the series started last year.

The complete texts of the standards can be obtained from the AMS, located in Washington, D. C.

Canned Red Sour Pitted Cherries

The standards of identity, fill of container, and quality for canned red sour pitted cherries promulgated by the Secretary of Agriculture under Sec. 401 of the Federal Food, Drug and Cosmetic Act of June 25, 1938, are hereby adopted for the purpose of these grades.

U. S. GRADE A or U. S. FANCY canned red sour pitted cherries are cherries of similar varietal characteristic; have a practically uniform, typical bright color; are practically free from defects; have a firm, fleshy texture; possess a normal red sour cherry flavor; and score not less than 85 points when scored according

to the scoring system outlined herein. Not more than 5 percent by count may be less than 10/16 in. in diameter.

U. S. GRADE C or U. S. STANDARD canned red sour pitted cherries are cherries of similar varietal characteristics; a fairly uniform good color; are fairly free from defects; have a fairly firm, fleshy texture; possess a normal red sour cherry flavor; and score not less than 70 points.

OFF-GRADE canned red sour pitted cherries are cherries that fail to meet the requirements for U. S. GRADE C or U. S. STANDARD.

Canned red sour pitted cherries that fall below the standard of quality promulgated under the Federal Food, Drug and Cosmetic Act shall be certified with the additional statement, "Below Standard in Quality," together with the reason for so certifying.

Red sour pitted cherries are sometimes packed in sirup. Sirup "cut-out" requirements, however, are not incorporated in the grades of the finished product, as sirup as such is not a factor of grade for the purpose of these grades. Canned red sour pitted cherries packed in sirup will be certified as to grade without regard to sirup density, but in each instance official certificates of grade will bear a notation in connection with the grade statement indicating the density of sirup found upon examination. For this purpose: "Extra heavy sirup" means that the sirup tests 28 deg. or over Brix; "heavy sirup" tests 22 to 28 deg. Brix; "light sirup" tests 18 to 22 deg. Brix; "water, slightly sweetened," means that the sirup tests less than 18 deg. Brix; and "water pack" means that the product is packed in water.

The maximum head space and minimum drained weights allowable in the sizes commonly used in packing canned red sour pitted cherries are shown in a table in the standards. Cans of red sour pitted cherries that have not been packed as full as possible without impairment of quality will be certified "Below Standard in Fill," regardless of the drained weight.

The grade of canned red sour pitted cherries may be ascertained by considering, in addition to the foregoing requirements, the following factors: color (25 points), absence of defects (35 points) and character of fruit (40 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The factor of absence of defects has reference to the degree of freedom from cherries blemished with scar tissue, scab, discoloration, hail injury, limb rubs, spray scald, bird or insect injuries, mutilated or pitter-torn cherries, or other abnormality, and harmless extraneous material (such as stems and leaf tissue). "Minor defects" are surface blemishes that discolor the skin but do not extend into the fruit tissue. A cherry showing surface discoloration having an aggregate area not exceeding that of a circle of 3/16 in. in diameter and not extending into the fruit tissue is not considered a defective cherry. "Major defects" consist of blemishes that extend into the fruit tissue, bird or insect injuries and mutilated or pitter-torn cherries. A mutilated or pitter-torn cherry is one that is split open so that the entire pit cavity is exposed.

As used in these grades, "pitted" means that all pits have been removed from the fruit with a tolerance provided of not to exceed one pit in each 20 oz. of net contents, based on a total quantity of contents of at least 24 lb. Count fragments of pits as follows: (1) Found loose in packing medium—(*a*) A piece equal to or smaller than one-half pit shell as one-half pit; (*b*) a piece larger than one-half pit shell as one pit. (2) Two or more pieces imbedded in or attached to the flesh of the cherry—(a) If their combined size is equivalent to one-half pit shell, count as one-half pit; (*b*) if their combined size is equivalent to more than one-half pit shell, count as one pit. "Normal flavor" means that the product is free from objectionable or off flavors of all kinds.

ISSUED: June 27, 1941
EFFECTIVE: July 15, 1941.

Canned Asparagus

The standard of identity for canned asparagus promulgated under Sec. 401 of the Federal Food, Drug and Cosmetic Act of June 25, 1938, is hereby adopted for the purpose of these grades.

Culturally bleached asparagus is asparagus so cultivated that the development of chlorophyll is inhibited. "White asparagus" is practically white or yellow-white. "Green-tipped asparagus" possesses yellow-green, green or purple heads. *All green* asparagus is green or yellow-green.

Canned asparagus may be peeled or unpeeled. *Spears* or *stalks* consist of the head and adjoining portions of the stalks, are packed parallel as closely together as practicable without injury to the product, are not less than 3¾ in. in length, and approximate in length the inside height of the can. *Tips* are packed in the same manner as Spears and are less than 3¾ in. but not less than 2¾ in. in length. *Points* are packed in the same manner as Spears and are less than 2¾ in. in length.

Cut spears are spears or stalks which have been cut into pieces without removal of heads or addition of bottom cuts. If cut in lengths of 1¼ in. or less, the product usually contains not less than 25 percent by count of heads. If cut in pieces longer than 1¼ in., the product usually contains not less than 33⅓ percent by count of heads. Certificates of grade shall indicate the percentage of heads found upon examination. *Bottom cuts* are edible spears with heads removed which have been cut into pieces.

U. S. GRADE A or U. S. FANCY canned asparagus is surrounded by practically clear liquor, is practically uniform in color, is practically free from defects, is tender, is free from objectionable or off flavors and scores not less than 85 points when scored according to the scoring system outlined in the standards.

U. S. GRADE C or U. S. STANDARD canned asparagus is surrounded by fairly clear liquor, is fairly uniform in color, is fairly free from defects, is fairly tender, is free from objectionable or off flavors and scores not less than 70 points.

OFF-GRADE canned asparagus is canned asparagus that fails to meet the requirements of U. S. GRADE C or U. S. STANDARD.

The container shall be filled with asparagus as full as practicable without impairment of quality. The product and packing medium shall occupy not less than 90 percent of the total volume capacity of the container. The minimum drained weights in the cans commonly used in packing canned asparagus are shown in a table in the standards.

Official certificates of grade on spears, tips and points will indicate the count and size, or combination of sizes, found upon examination. If it is apparent that the asparagus has not been graded for size, certificates of grade will designate the product as "Ungraded for Size."

The grade of canned asparagus may be ascertained by considering, in addition to the foregoing requirements, the following factors: Clearness of liquor (15 points), color (15 points), absence of defects (30 points) and tenderness (40 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The factor of absence of defects has reference to the degree of freedom from grit, open heads, flowered heads, shattered heads and from units damaged by spots, stain, discoloration and me-

chanical, pathological or insect injury. "Diameter" means the longest measurement across the base of the unit. "Grit" (or sand) is rough, hard particles of earthy sediment. "Open heads" are asparagus heads in which the florets have begun to flower or have started to

(Turn to page 85)

Testing Paprika By Color Comparison

By C. W. NEUSBAUM
Chief Chemist, Vincennes Packing Corp., Vincennes, Ind.

To control the quality and flavor of a finished product, the quality of the ingredients must also be controlled. Here is an easy way to evaluate paprika by its color. It can also be used in quality and color control for other foods.

PAPRIKA is the dried ripe fruit of *Capsicum annum L.* It is ground to various degrees of fineness. Different grinds on identical samples often show an apparent difference in color. Naturally, when 100 per cent red ripe pods are used—and proper precautions are taken in removing the seeds, cores and stems, in the drying and in the grinding—one obtains a paprika which will have a maximum red color value. When underripe or yellow pods are used, one obtains a paprika of low red color value; and when one carries this still further and uses some green pods, one obtains a very poor yellowish-green paprika with practically zero red color value. From this it is evident that a numerical evaluation of the red color constituent is an excellent indication of the quality of the paprika in question.

The total amount of the extracted oil alone, however, does not give a true indication of the quality of the paprika, as the oil is composed of two colored oils—namely, yellow and red, with the yellow predominating. A paprika may have a rather high total oil content and yet not be of very good quality due to a lesser amount of the red oil being present, indicating a lesser amount of ripe pods having been used in its manufacture.

Evaluation of the relative amount of the red constituent seems to give a fairly accurate value of the paprika in regard to both flavor and color. In the laboratory, we have been able to evaluate this red color concentration with high degrees of accuracy on duplicate samples. The procedure is given herewith and, after a few trials, satisfactory determinations may be made by almost anyone on a routine basis.

Standard Dyes Used

Inasmuch as we are interested primarily in the red color value, we have made the standard dyes up in such a manner that the standards are adjusted from the red side. Further dilutions of the red standard dye, of course, can be made to obtain higher degrees of accuracy in the red color readings. This is entirely optional with the operator and depends on the accuracy desired. Various red and yellow dyes may be used, and no claim is made that the dyes used cannot be replaced by other dyes, or that other solvents could not be used to greater advantage and possibly to greater degrees of accuracy, in some instances.

It suffices to say that the procedure here outlined gives excellent results. But anyone attempting to use this method may find it to their advantage to make certain optional changes to meet their own individual requirements. After a series of trials and tests, particular dyes have been selected because they are readily available in rather pure form and are quite uniform from one lot to another. The dyes are fairly stable, and if kept well protected, will serve their purpose very well over extended periods.

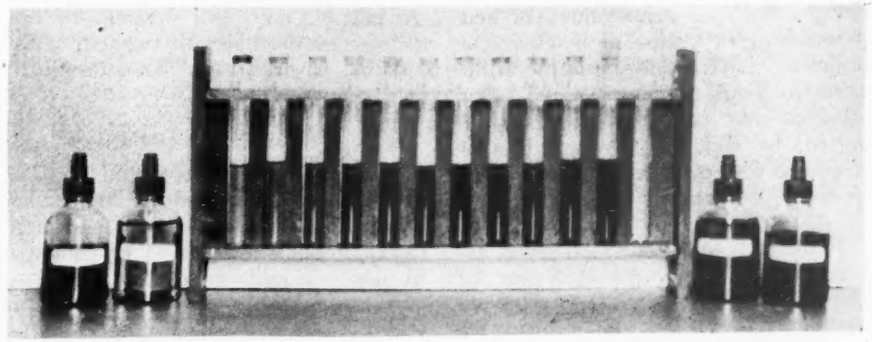
The standard solutions also appear to be fairly stable, if properly stored, and, therefore, will serve for quite a period of time. But inasmuch as most of the larger paprika deliveries are usually made within a given period of time after harvest, the need of making up new standards is not often necessary.

When making color determinations on lower grades of paprika, it is often necessary to make up an additional color standard using a blue dye to get a better color match. We, however, have not gone into this matter very seriously, for if a paprika is so low in color value as to require this, it is usually not suitable for anything except a purely yellow or yellowish green color value. Paprikas of this class also as a rule have a very poor flavor and are rarely used.

How Test Is Made

Weigh accurately 5 gm. of paprika and place in a titer tube (1x4). Mark tube with sample number or other means of identification.

Measure out 25 c.c. of ether and carefully pour onto paprika without splashing. Stir with a small stiff wire, and mix thoroughly for one minute. Mark volume or titer tube with a file, adhesive strip, or wax pencil. Allow to stand for ten minutes and stir and mix again. Make up to volume and mix thoroughly. Allow this to stand until paprika particles settle, leaving a clear solution. Treat all samples in exactly the same manner, as the results are on relative basis. If a greater degree of accuracy is required, a Soxhlet extraction apparatus may be used, making all samples up to 25 c.c. after extraction and using such aliquot portions to make



Color comparison standards used in evaluating the color of paprika and other foods.

the test as will suit the degree of accuracy desired.

Measure out exactly 5 c.c. into a 20 c.c. test tube (⅝x6), add 5 c.c. of ether and mix thoroughly. Compare the color of this extraction with a set of standard color tubes for numerical evaluation.

Color Standards for Test

Weigh out accurately 0.2 gm. of Naphthol Yellow S4 and dissolve in 40 c.c. of pure alcohol, then make up to exactly 200 c.c. with distilled water (yellow standard solution). Store in amber glass bottles in dark cool place.

Weigh out accurately 0.1 gm. of Amaranth (107) and dissolve in 20 c.c. of pure alcohol, then make up to exactly 100 c.c. with distilled water (red standard solution). Store as indicated for yellow standard solution.

Add to each of ten test tubes (⅝x6) exactly 10 c.c. of the yellow standard solution. To the first of these add one drop of red standard solution. To the second add two drops, to the third add three drops, and continue this progression until you have added ten drops to the tenth tube. These tubes will give a color scale for comparison of paprika extractions and should be sealed, protected from light, and kept in a cool place when not in use.

In actual practice it has been found that the tube containing ten drops of the red standard solution matches the highest grade paprika in color value. Only on one or two occasions have we found paprika which gave an extraction that had a higher red color value than the tube with ten drops of red standard solution. In cases of this kind, an eleventh tube may be made up containing eleven drops, and comparisons interpolated on this basis, or a new standard solution may be made using 110 mg. of dye in 100 c.c. of water. From this make up a progression of color standards similar to procedure outlined above and make comparisons. Care should be exercised in holding dropper vertical and basing all results on one standardized dropper.

Considering the tenth tube as having 100 per cent red color value (in lieu of matching extraction of best paprika available), it is a case of simple arithmetic to place a numerical red color value on any sample of paprika submitted, by comparing extracted color of sample with color standards.

To Get Higher Accuracy

If a higher degree of accuracy is desired, a third color standard may be made by diluting exactly 10 c.c. of red standard color to 100 c.c. and using for intermediate percentages (Red No. 2).

Example: Suppose an extraction of paprika showed a color rating somewhere between the color standard of tube 9 and tube 10, or between 90 and 100 per cent. Measure exactly 10 c.c. of yellow standard solution into a test tube (⅝ x 6), add nine drops (using the standardized dropper) of red standard solution and shake; then add, drop by drop, the Red No. 2 until an exact match is obtained, which may have required seven drops. In this case the red color value of this paprika would be numerically indicated as 97 per cent red color value. Likewise, the value may be determined on any sample whose color falls between any two consecutive tubes, if this degree of accuracy is required.

The care exercised in the manipulation of this test is reflected in the accuracy obtained. If only approximate evaluation is necessary, then a set of ten tubes, or eleven at the most, will suffice for the standards. If too long a time elapses between tests, new standard solutions should be made. We have found the standards suitable for periods up to five months, if properly stored and protected.

Testing Other Products

With a little preliminary work, it is possible to establish a procedure to determine the numerical color values of other products which contain soluble color constituents of the red and yellow types. The most suitable solvents and extracting solutions would necessarily have to be established and standardized. The color standards could be made on a basis of allowing 100 percent color value for the best available product in each instance, but different dye concentrations would likely be necessary for each product. The numerical red color values of tomato products can be determined in this same manner. There are several solvents which could be utilized for the extraction of the color constituents. We have found both acetone and benzene quite satisfactory for extraction of the color of tomato juice, catsup and puree. Similarly, the color value of carrots, red peppers and chili peppers, by extraction of the color or pigment with suitable solvents, may be determined on a numerical basis.

Results of Tests

In testing paprika according to this method, some very interesting results have been obtained. Paprika, which from all outward appearances seemed to possess a fairly good color, rated as low as 30 percent red color value. Other paprika, which has been ground rather fine and which did not appear particularly good, had a fairly good scoring—at least, slightly better than was anticipated. Paprikas based on the same price of 40 cents per pound, but from different sources, had red color values ranging from 40 to 100 percent.

It has been particularly noticeable in the past four years that it has been very difficult to obtain fairly large lots of paprika of uniform color and of suitable quality for sauces, vegetable soup, catsup, chili sauce and other products which require high quality paprika. Furthermore, the price quoted does not appear to have any relation to quality in many instances. It has been my experience that paprika which scores less than 80 percent red color value is of doubtful value and one that scores below 70 percent is practically worthless for these products, and may even have a detrimental effect.

Test Used in Buying

When samples are submitted to the purchasing department and subsequently to the laboratory, they are immediately evaluated for color. If they score below 80 percent, they are rejected as "not suitable." If samples score above 80 percent, quotations are taken into consideration and, if reasonably satisfactory, purchase is made "subject to the delivery being equal to or better than sample." The color rating is recorded in the laboratory and on balance of sample. When shipment is received, it is inspected and tested. If quality does not coincide reasonably well with that of sample, the lot may be rejected as a whole or in part as the case may warrant. By restricting purchases, and buying only from good reliable firms I have found this arrangement to be satisfactory to all concerned. It, furthermore, minimizes the possibilities of receiving paprika which is not suitable for your purpose, or which might be adulterated in some form or other.

The color evaluation test is based on unadulterated paprika, and minor adulterations cannot be detected except by other tests—such as saponification, iodine number, index of refraction and others. Gross adulteration with vegetable oil will usually create suspicion due to the fact that the test is based on red color value and not total quantitative extraction. If dyed (red) vegetable oil or oil soluble red dyes have been used in the adulteration, unusually high red color values result which would arouse suspicion. A drop of the extract on a filter paper will usually give a good indication. Other chemical tests may also be applied for further substantiation, if there is cause to suspect adulteration.

Shorts on Shortages

You are not alone in your troubles growing out of the defense program, as the items on this page will testify. And you will find it interesting to see what others are up against. Perhaps you also will get some ideas that will stand you in good stead.

WITH problems of procurement and discovery of possible substitutes growing more difficult every day, FOOD INDUSTRIES is reporting from time to time on shortages that exist or may be anticipated. The first installment appeared last month. The second follows.

You are invited to contribute your own ideas or experiences to this department. Simply mail them to the editor.

Tin Shortage in Japan

JAPAN, which is supposed to be the probable trouble maker for the United States by interfering with our tin and rubber deliveries from the Far East, is out on a limb herself as far as tin is concerned. According to a dispatch from Tokyo on September 5, the Nippon Canned Goods Manufacturing Association has obtained approval from the Ministry of Agriculture and Forestry of a plan to require all purchasers of canned foods to return the empty cans. Significant, if true.

New Competitor for Kraft Paper

WITH shell-loading plants beginning to start operations for the Army Ordnance Department, a new competitor for paper looms large. Heretofore, large caliber shells have been packed in wooden boxes. In recent months, however, the Ordnance Department has revised its packing specifications to permit the use of solid-fiber shell packing cases. The huge plant at Harvey, Ill., formerly owned by Austin-Western Road Machinery Co., has been taken over by American Can Co. to manufacture these cases.

Even though the United States does not enter a shooting war, the demands for kraft paper for these cases will be enormous until ammunition stores have been built up. If land hostilities should begin, your guess is as good as the next as to the possible effect of this new competition for paper. It is understood that these paper packing cases for shells run up to 14 plies, versus the usual 3 and 4 plies for containers for foods.

Big Business, 1941 Style

THE most recent basis for compensation for supplies salesmen is said to be a 10 percent bonus for every cancellation.

Extra-Standard Corn Shortage

PITY the corn packers this year who have large future contracts for extra-standard quality, but owing to the vagaries of nature, appear to be able to pack nothing but fancy. Usually it's the other way around. Some of these packers are deliberately letting corn stand in the field to lower its quality, which is a form of quality control that is generally detested by all. For it reduces No. 1 quality to No. 2 in order to avoid delivering No. 1 quality on a No. 2 contract price.

Incidentally, this scarcity of extra-standard corn will account for the reluctance of corn packers to respond avidly to Army and Navy invitations to bid unless fancy prices will be paid—which they will not.

Ship-Space Priority

THE Maritime Commission has now established official priority units for the allocation of ship space. Food men who require water movement of goods, either raw materials, partly finished products or final products, have to demonstrate the urgency of their need from a defense point of view before they can be sure of cargo space.

Pickles Hurt by Drought

THE troubles of Middlewestern pickle salters arising from dissimilar price schedules in contiguous areas have been heightened by the late summer drought. Some firms with long memories, recalling that soaring prices make a farmer forget his contracts, offered to buy on a flat price for field-run cucumbers. Others, seemingly forgetting 1917, are buying on a graded basis, which is more scientific—but farmers are not scientists. Non-contracting, freelance, flat-price buyers are raiding the territory and getting most of the cucumbers. In one case in graded-price territory, a farmer brought a heavy load to a salting station, found nobody in attendance and cheerfully and rapidly drove away. Inattention to business in times like these will mean empty tanks next spring and little to sell.

Get Your Antifreeze Now

ALL types of antifreeze will be scarce next winter. Food manufacturers with truck or salesmen's fleets of cars better buy their stocks soon. The first cold weather rush may develop serious shortages.

New Container Material

AFTER the rush of defense preparations is over and we take stock of our situation, it is likely that the debit side of the current furore will be partially offset by certain definite gains. Recent developments in solid fiber containers will serve as an example. A new Type A board, which is the preferred material for cases to be shipped to England, is waterproof to an astonishing degree and can stand a two-hour immersion in water without coming apart or the plies opening up to any marked extent.

While Type A board is not yet available in sufficient quantities to meet the current demands, it looks like a development that has great potentialities.

A-2 Priority for Research

OPM has given an A-2 priority rating to research laboratories, which is an indication of the value of research. The catch in this situation, however, is that the application for A-2 rating will be passed on by the National Academy of Sciences.

Presumably the Academy will evaluate not only the purpose but also the quality of the research work. About 2,000 laboratories are said to be applying. It might be worthwhile for research directors in the food industry to consider the defense value of current projects.

Modern air liners fly at 8,000 to 10,000 ft., at which height foods are exposed to extreme drying effects.

Air Line Must Buy Top-Flight Foods

By MILDRED INWOOD

Chief Dietitian, United Air Lines, Chicago, Ill.

It takes high quality to stand up under conditions of preparation and serving. What a leading air line looks for in foods, and how it does its buying, are told in this article by the creator of Mainliner Menus.

IN selecting foods for air-line service, two major factors must be considered. The first is quality. Only high-quality foods will stand the test. Most of the food is prepared from two to four hours before serving time. It takes a fine filet mignon to stand two or three hours after broiling and still be tender and juicy when the passenger eats it. Meats must be tender and therefore must come from top-ranking carcasses.

Likewise, vegetables must be young, tender and succulent, from choice crops which have been properly handled before delivery to kitchens.

Quality in rolls and cake is important, also, because of the extreme drying effects of high altitudes. Butterfat content runs higher than in ordinary bakery goods.

The second factor to be considered is the type of food selected. Here there are several controlling criteria. Popular appeal might well be given first place, since we must present a menu which is generally well liked. Space and weight limitations make it necessary to supply one menu completely balanced and selected with care, from which the passenger has only two choices, between the listed dessert of the day and cheese and crackers, and between beverages—coffee, milk, tea and hot chocolate.

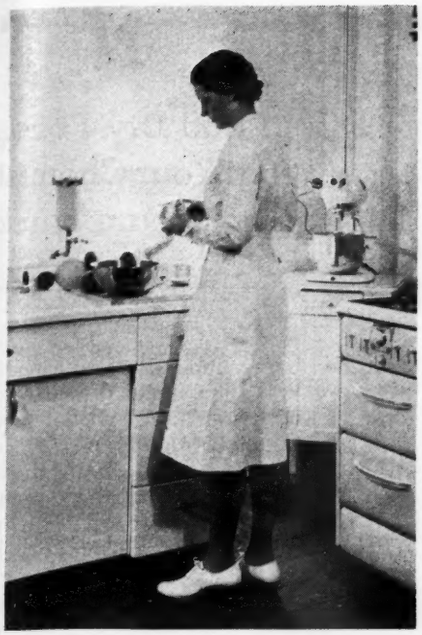
Digestibility Important

Trial and error, as well as passenger comment, has caused us to diminish our meat list to include chicken, beef, lamb, turkey and occasionally ham. Vegetables are limited to the mildly flavored ones, as the strongly flavored kind not only create an objectionable odor when served, but are generally considered to be gas-forming and therefore not as readily digested. Digestibility is seriously considered and menus are planned to give a good balance between starches, fats and protein foods. The aim is to satisfy the appetite, but not overload the stomach with rich foods or an improper combination.

Fresh, Frozen, Canned Foods Used

Fresh, frozen and canned foods are used, of varying kinds and quantities. Only the finest quality canned articles are purchased. Unlike in earlier years, canned foods of excellent quality are now available.

Considerable quantities of frozen foods are purchased, and for a number of reasons: Cleaning and preparing the vegetables for cooking is simplified, the vegetables are uniform, they are of the best quality and were frozen at exactly the best ripening stage. And these factors also apply in buying frozen fruits.



Mildred Inwood, the author, at work in the research kitchen maintained by United Air Lines at Chicago. She tests new foods and prepares new menus.

Such easy-to-prepare foods as cuts of meat that are ready to cook and need no boning are not purchased. United buys a rack of lamb, for example, and prepares the lamb chops. The company's commissaries are well staffed with chefs and cooks' helpers who are expert at handling meat, and can do their own boning and rolling and trimming of fat.

Boneless squab chicken for instance, is a tedious thing to prepare, but United's own kitchen men do it.

How Foods Are Purchased

With the increase in volume of business and number of company-owned and company-operated kitchens, the purchasing plan has been revised to take advantage of future contract buying of canned goods.

At the annual United Air Lines chefs convention, which is held at the Chicago general offices, a cutting and sampling "bee" is conducted to determine which packs will be used and which items will be standardized for the six commissary-kitchens spaced along United's 5,200 miles of routes. Purchasing is handled through the central purchasing department and each chef requisitions his predetermined quantities as they are needed. All other food purchases are made by the chef in charge of each kitchen.

Methods of Preparation

Foods sent from the kitchens to the planes are completely prepared before packing. Cold foods are refrigerated with dry ice, with care being taken to use just the right amount of cooling and to prevent freezing. Cold liquids such as water, iced tea or lemonade are packed in precooled thermos jugs.

Hot meats and vegetables are transferred directly from the stove into hot china casseroles which are used later for service in the lunch box. These casseroles are packed in corrugated boxes which have been lined with a thick layer of "Kimpak"—a lightweight insulating material. The boxes are then sealed shut with tape and the heat is retained for several hours. This method of packing hot foods is superior to the one used previously (placing meat and vegetables in preheated gallon thermos jugs) because the food can be packed as it will be served and there is no loss of heat due to transfer of food from jug to casserole.

Will Be Different

With the rapid strides toward perfection being made every day in airline food service, methods may be declared obsolete overnight in an effort to attain the ultimate in sky dining.

Stewardess of United Air Lines Mainliner serving dinner above clouds to plane's 21 passengers. Only foods that are easily digested are put on Mainliner Menus.

Once a year these seven United Air Lines chefs get together at Chicago and conduct a cutting and sampling bee. At that time they determine which packs will be used and which items will be standardized for the six commissary kitchens spaced along United's 5,200 miles of routes.

MANAGEMENT

Trailer Which Hauls Both Liquid and Dry Foods Cuts Trucking Costs in Half • What Your Chemist Can Do for You • New Type of Ice Cream Truck

Tank Trailers Haul Feed And Cut Costs in Half

Here's a great cost-saving idea for others. Liquid product is carried one way and dry product in bags the other. Tank trailers are specially designed to haul both efficiently. No extra cost involved.

BY hauling liquid residue yeast in its tank trailer one way and poultry feed in bags the other, Milbrew, Inc., Milwaukee, Wis., has cut its trucking costs in half. In other words, the usual nonproductive empty tank haul has been made to pay dividends that reduce by one-half the unit transportation costs.

This comes about because two separate loads are handled on each round trip instead of only one as when the trailer is operated empty in one direction. As fleet owners in the food field know, it costs almost as much to operate a tractor-trailer light as it does loaded.

This 50-percent saving in trucking costs has been obtained without any expensive equipment on the trailer itself. Having the desired result in mind before ordering the trailer tank, it was only necessary to specify a bolster-type tank with a fairly flat top and bottom and with manholes and covers of a little larger diameter to permit easy loading and unloading of the bags.

While the Milbrew, Inc., operation is of itself unusual, it may nevertheless suggest to other tank-trailer operators some two-way combinations of loads.

How System Works

Milbrew, Inc., purchases and hauls the residue yeast used in making beer from the many large breweries in the Midwest within a radius of 400 miles from Milwaukee. The yeast coming from breweries within a radius of 250 miles is hauled by the tractor-trailer tank shown on these pages. That coming from within the 250- to 400-mile radius is shipped to Milwaukee in railroad tank cars. And lastly, that coming from within a 100-mile radius is hauled by one of the four other smaller tank trucks operated by the Milbrew company. When it reaches the Milbrew plant, the yeast is dehydrated and, with other ingredients, processed into a poultry feed in a powdered form which is packed in 100-lb. bags.

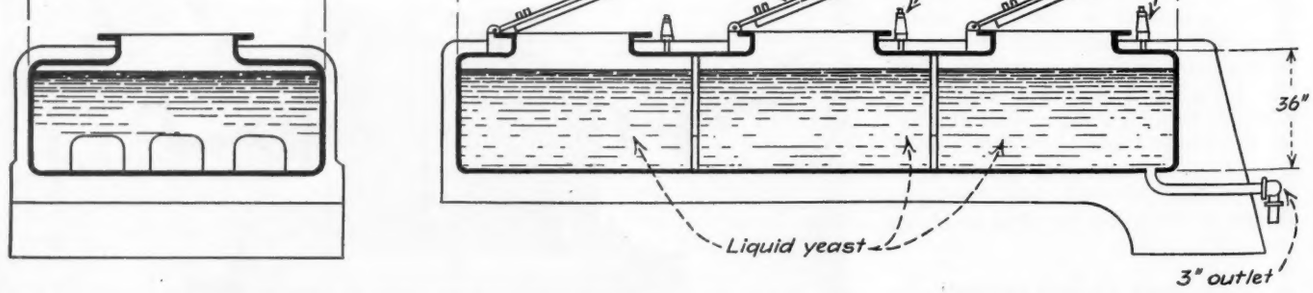
In the Milbrew operation it was thus the outbound rather than the usual inbound portion of the round trip which would have been the empty and nonproductive part of the haul if the trailer tank had not been designed to carry the feed in bags.

For example, the tractor-trailer may take a 10,000-lb. load of the feed to St. Paul for distribution in that city and then pick up a load of yeast from a brewery at La Crosse, Wis., and haul it back to Milwaukee. Or again, the unit may take a load of the feed to Chicago, deliver it there and then continue on to Fort Wayne, Ind., for a load of yeast for Milwaukee.

Construction of Tank

In construction, the tank is 19 ft. long, 92 in. wide and 36 in. deep. It is of the bolster type with fairly flat top and bottom with rounded front corners of 18-in. radius.

The flat top permits the driver to stand on it without additional catwalks, to load and unload the bags of



Transverse and longitudinal sections of the Milbrew, Inc., trailer tank as it is used to haul 2,800-gal. loads of liquid residue yeast to the Milbrew processing plant in Milwaukee, Wis., from breweries in the Midwest within a 250-mile radius. The tank is divided by two baffle plates into three transverse sections, each fitted with a safety valve to allow the escape of any CO_2 gas formed in transit. The yeast is liquid enough to flow by gravity out of the 3-in. outlet at the rear of the tank, but in practice it is pumped out of the tank by a suction pump for storage on the upper floors of the Milbrew plant.

Close-up of the Milbrew Fruehauf trailer tank and International tractor with a sleeper cab as used to haul liquid residue yeast one way and bags of processed poultry feed the other. The driver is shown opening one of the three 42-in. diameter manholes through which the 100-lb. bags of feed are loaded and unloaded. The sleeper cab is utilized by the second driver on the unit for runs up to 250 miles from Milwaukee.

feed. The depth of 36 in. was specified so that the bags of feed might be dropped into the tank upright and shoved into place by the tractor driver. The bags are carried one high inside of the tank.

The interior of the tank is divided into three sections by means of baffle plates to reduce surging when the liquid yeast is carried. However, since these plates have holes along their lower edges, they do not form fluid-tight compartments.

Access to each section is made through a 42-in. manhole in the top of the tank. These large diameter manholes permit the driver to get down inside the tank with ease to load and unload the bags.

The feed-bag load of the tank is 10,000 lb., made up of 100 bags of 100-lb. each, with 34 bags carried in the center section and 33 each in the front and rear sections.

The liquid load is 2,800 gal. of the residue yeast. This is the yeast which has been used to ferment the beer. It is a residue in the vats after the beer has been siphoned off. It is still active but contains some hops. It is fluid enough to flow by gravity out of the 3-in. outlet pipe at the rear of the tank. But in operation, it is pumped out of the tank by a suction pump, since the yeast is stored on the upper floors of the Milbrew plant until it is ready to be processed.

Cleaned After Each Trip

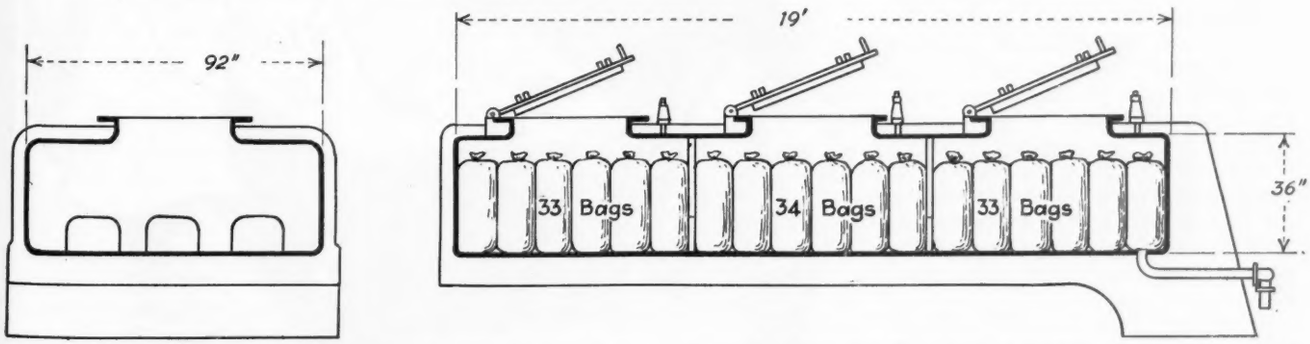
Because the residue yeast is still active while in the trailer tank, the tank must be washed and sterilized after each trip. This prevents any wild yeasts from remaining in the tank and causing infections.

The tank and trailer were made by Fruehauf Trailer Co., Detroit. The tractor of the unit is a cab-over-engine Model D-500 International fitted with a sleeper cab.

Why the Sleeper Cab

When the one-way mileage of the trip is 250 miles or over, two drivers are employed, one sleeping in the special cab while the other is driving. Aside from the desirability of using two drivers on the long runs in order to get the outbound feed load delivered and the tankfull of yeast returned to Milwaukee as quickly as possible, the use of two drivers becomes mandatory when state lines are crossed and the vehicle comes under the Motor Carrier Bureau regulations of the Interstate Commerce Commission. These regulations require that no driver may drive continuously for more than 10 hours without a rest period of 8 consecutive hours or more than a total of 60 hours in any one week.

The tractor-trailer combination pictured here has been in operation for a little more than a year. During that time it has covered approximately 54,000 miles.



Sectional views of the Milbrew trailer tank showing how it is loaded with 10,000 lb. of dry processed poultry feed in 100-lb. bags. The bags are loaded and unloaded through the three large diameter manholes on the flat top of the tank. In loading, the bags are dropped into the tank in an upright position and then shoved into place by the driver. Thirty-three bags are carried in each of the front and rear compartments of the tank and 34 in the center section. The tank has an outer shell but no insulation.

What Your Chemist Can Do for You

By WALDEMAR DASLER

Research Chemist, Nutrition Research Laboratories, Chicago, Ill.

The value of a chemist to a food company depends to a great extent upon the management. You must know how to work with a chemist to get the most out of him. Here are some tips.

THERE are many problems that arise in an industrial food plant that cannot be completely solved without the help of a chemist. It is the duty of the plant management to know, in a general way at least, what their chemist does. It is not enough that you should merely answer, "he tests things," when asked what the duties are of your chemist. If this is your answer, you are in all probability only receiving a small part of the benefit which your laboratory is capable of giving you. It may strike you as strange, but it is true, that the value and productiveness of your laboratory depend largely on you.

You want certain answers from your chemist. When your chemist furnishes these, perhaps you forget about him until you have another question for him to answer. But why not find out what goes on in your laboratory? What has your laboratory staff been doing? What has it done this week? You may have wondered about this occasionally, but perhaps you shied away from these questions because you felt that the chemical and bacteriological duties of your laboratory were too technical for you to understand. Still, your laboratory is, or should be, a service department, and you can work together with it successfully without knowing how to run a Kjeldahl determination for nitrogen just as well as you can cooperate with your engine room without being able to reassemble a dismantled diesel engine.

In order for you to work efficiently with your laboratory you must, however, have some conception of its problems. You must realize that your chemist does not do his "testing" nor obtain his results by means of a divining rod. Some of his routine analyses, for which he has his reagents prepared and standardized, his apparatus set up and his methods well in mind, can be completed in a few minutes. Other analyses and operations may require days to complete. Still others may require a time-consuming survey and a study of available methods and data. It may even happen that you desire occasional data which may be impossible for your laboratory to obtain, for certain procedures require complicated and expensive equipment. Chemistry is highly specialized and you may want answers to questions in fields as divergent as boiler waters, lubricating oils, vitamins, detergents, disinfectants or corrosion inhibitors.

What Executives Should Do

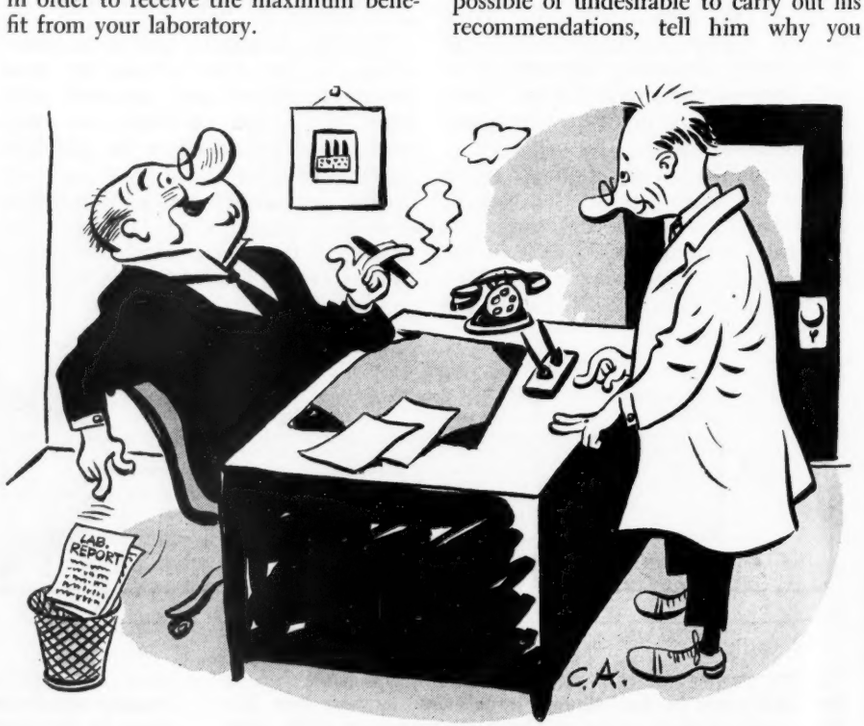
There are a number of things which you as an executive can and should do in order to receive the maximum benefit from your laboratory.

You have, of course, hired a competent chemist or head chemist whose knowledge and opinions you can respect and whose findings you can trust. Having hired such a man, do you respect his opinions and trust his findings—or do you insult him by placing more faith in the word of a salesman or in a preconceived idea of your own? Your laboratory does not deal with pseudo-scientific superstitions, it deals with facts. Do not throw out its findings if these findings should not agree with a deep-seated belief or theory.

The chemist informs you of his findings by means of reports. It is a good idea to read his reports—all of them. Let him know that you read them. If the significance of certain results or values is not quite clear to you, ask your chemist about it. It is the firm conviction of many chemists that reports are filed, but not read.

How often do you talk to your head chemist regarding his problems, his findings and his suggestions? If you want your laboratory to be the efficient service department that it should be, confer with him often—weekly, if possible. Set a definite time aside for these conferences and stick to it. Let him tell you what he is doing and what his problems are. Tell him your ideas, your problems and your suggestions.

Talk over your chemist's recommendations with him and, if you are not convinced that they are desirable, make him prove his point. If you find it impossible or undesirable to carry out his recommendations, tell him why you



"O.K., Jones. I'll look at it later."—And he wonders why his laboratory doesn't pay dividends!

cannot or will not put them into effect. You are undermining the morale of your organization when you discard the suggestions and recommendations of your subordinates without ever a comment, a question, or a word of explanation.

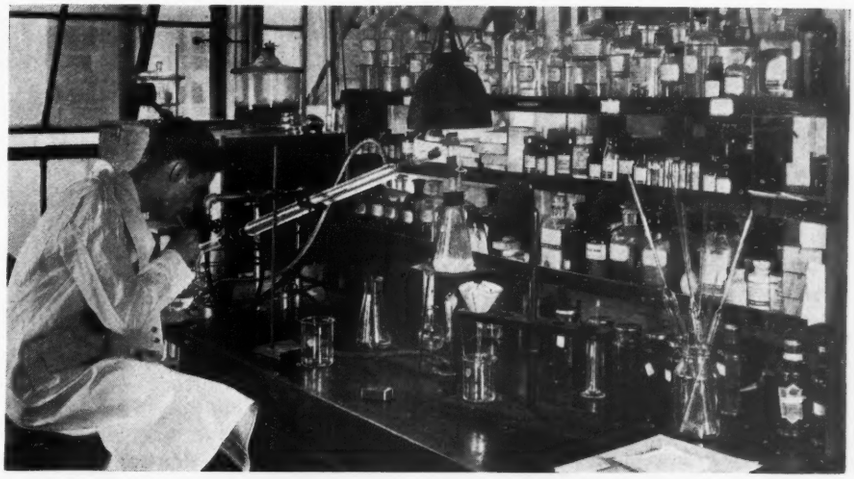
Conferences Help

This matter of conferences can well be carried a step further. All your departments can use the services of the laboratory to good advantage. It is, therefore, a good policy to hold regular and frequent meetings of the executive department with the superintendent, the laboratory head and the department foremen at which mutual problems can be discussed. Have your sales manager attend these meetings. Many costly mistakes are made because sales and production departments do not know each other's plans. Your sales manager can also give the production and control dpeartments valuable information regarding consumer criticism. You can all work together at setting up and improving standards for your products, formulating specifications for raw materials and initiating changes in production methods.

These meetings will be a revelation to all participants. You will be pleased with the ideas that the discussion of your problems will stimulate. The meetings will make progress easier and will do much for the spirit of cooperation in your plant.

You can also help keep the technical staff progressive and on their toes in other ways than by plant meetings and conferences. Does your chemist, for instance, feel free to attend the meetings of chemical, technological and industrial societies? Chemistry and food technology are ever-changing fields and the chemist must keep abreast of the times in order to maintain his usefulness to you at a high level. Equal in importance to the educational value of these meetings is the mental alertness engendered by the contacts he makes and the stimulation of new and different ideas. At these meetings, too, the chemist has an opportunity to meet and talk to other chemists and technologists with whom he can discuss mutual problems and from whom he can obtain expert opinions.

In order for the food manufacturer to make satisfactory progress and to maintain the efficiency of his organization on an equal footing with that of his competitor, he should support an active research program. Research can be very practical and of incalculable value to the food manufacturer. It pays a large return on your investment.



Your laboratory is a service department. Take your problems to it. It does more than just test things. It improves old products, develops new ones, reduces costs, takes "bugs" out of processes and packages, and what have you. It's most valuable, in fact, if you know how to use it.

The Big Dividends

Would you, for example, like to have someone find out what is the matter with your product when it develops off-flavors and off-colors? That is research. Would you like to have your laboratory improve your products and lower their costs? Would you like to have it develop new products? That is research. Would you like to have your chemist find the causes for spoilage and discover the means for eliminating these causes? That also is research. If you look for them, you can find a hundred profitable research projects in your plant.

Put your chemist or your research director into the plant. Let him spend some time in each department and acquire first-hand information regarding production methods. He will find many things that require attention and study, and the familiarity with production methods will guide him in the research projects upon which you and he decide.

Although research can do much for the producer, do not look upon it as the oracle that can answer all your questions for the mere asking. All the research projects will not be crowned with success. Some may yield only negative answers, but a negation may be very valuable. It may be very important to know that a certain operation cannot be carried out under certain conditions. Other projects will end in failure. This must be realized from the start. As you go along in your research program, however, you will find that the successes can easily carry the failures. Your salesmen, too, are successful will only a fraction of their prospects.

Research is time-consuming and requires thought and concentration. It cannot be done properly by a person who is loaded down with control or routine work. A research project that must be interrupted at frequent intervals for considerable periods of time, to make, for example, analytical surveys of competitors' products, may lose its interest for the worker. A chemist's enthusiasm for a research problem can be smothered by the weight of inaction if it must be carried on in occasional stolen minutes. Perhaps your staff needs to be enlarged to carry out some of the research which is begging for attention in your plant. If your organization is small and your means are limited, start out with a single full-time research chemist. If the investment proves to be a good one, you can always increase your staff, but don't burden your chemist with non-research duties.

Furnish a Library

Lastly, in order to receive maximum returns from your laboratory investment, furnish it with an adequate library. This library should include reference works containing tables, official and standard methods of laboratory procedure and specialized information in your field. In addition, it should subscribe to such scientific, technological and trade journals as can be useful to your laboratory. Do not consider it a waste of money to subscribe to journals which only your chemist can read and understand. By the expenditure of a few ten-dollar bills annually, you are multiplying your laboratory a thousandfold, for you are not merely buying scientific literature, but the results of studies and research programs carried out in the world's finest and best equipped laboratories.

"Soda Fountain" Truck Speeds Delivery

Saves time and refrigeration in distribution of ice cream. Radically different, it carries the ice cream in insulated cabinets inside a panel body.

NICKNAMED the "soda fountain" truck because it carries its ice cream in vertical cabinets with covers on the top, instead of in a box-type body with doors on the side, the new type of ice cream route truck shown on these pages is designed to reduce the time of delivery and the cost of refrigeration.

This radically new type of ice cream truck, which has been operated during the summer by Golden State Ice Cream Co. in Sacramento, Calif., was designed and built by Karl Koefoed Body Co. of San Francisco.

As shown in the accompanying illustrations and sectional drawings, the body is built upon a new principle. Instead of carrying its ice cream in a box-type of body with insulated floor, roof, sides and ends, with doors on the right hand or curb side of the body for loading and unloading, the new type of body is composed of a conventional, insulated panel body with vertical ice cream cabinets much the same as those used in the typical soda fountain store, built into the body proper.

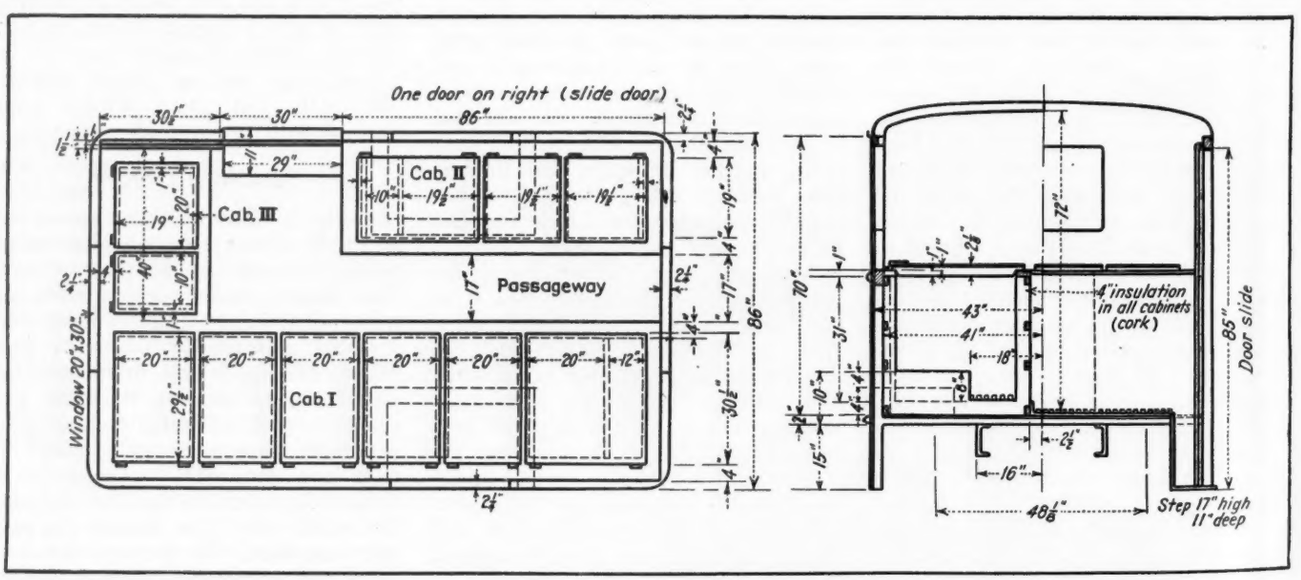
Eleven of these cabinets in all are installed in the body illustrated here. Six are arranged in a line on the left-hand side of the body—two at the front and three on the right-hand side to the rear of a regular sliding door built into the curb side of the panel body. This door, with a convenient step below, is utilized by the driver to get into and out of the body in a minimum of time. A central passageway 17 in. wide is provided between the two rows of side cabinets to make each individual cabinet equally accessible to the driver.

Regulation glass windows, 30 by 20 in., are provided in the body sides and front and rear ends to let plenty of daylight into the body interior. In addition, regular electric dome lights operated from the truck's storage battery are installed to provide adequate illumination on dark days and at night.

How the above arrangement of cabinets reduces the time of delivery may be understood from a brief comparison of the methods of the operation of the new type of body and that of the conventional two- or three-hole refrigerated body. The interior of the conventional type of body, whether made up of one large compartment roughly 7 or 8 ft. long, 5 or 6 ft. wide and 4 or 5 ft. high, or divided into three compartments by transverse partitions, is reached through two or three doors on the right side of the body.

These doors are made as small as possible to keep the cold air inside the body from escaping into the atmosphere each time any of the doors is opened by the driver to get out ice cream. Usually they are about 2 ft. square. Making these side doors as small as possible helps to retain the refrigeration inside the body. But the smaller they are made, the harder and more difficult and time consuming is it to load the ice cream at the plant and then unload it piecemeal at each delivery stop.

This unloading difficulty is further increased as the number of ice cream flavors carried in the load is increased. It is evident that all the flavors cannot be stacked in the far corners farthest away from the doors or else the truck goes out with its body only partially loaded. So if the first customer served on the route wants some of those flavors stored in the far corners, the driver must take out the cans or cartons in front, stack them on the sidewalk, get the



Plan and sectional views of the Golden State Ice Cream Co.'s "soda fountain" truck body as made by the Karl Koefoed Body Co. of San Francisco, Calif. The positions of the eleven separate compartments are shown in the plan view. Compartment temperatures of about 15 deg. F. are maintained by means of a "Kold-Hold" refrigerating system in which 1½-in. plates are inserted betwen compartments to conserve space. The Kold-Hold plates are refrigerated each night from a central compressor through outlets located in the company's garage. The cabinets are built into the truck body as a unit and not as individual compartments, although each is separately insulated. Racks on the bottoms of the cabinets protect the floor against excessive wear. A removable panel in the rear wall of the body permits the compartments to be removed when necessary for repairs.

Mounted on a cab-over-engine G.M.C. chassis to provide a maximum body length with a minimum overall length, the "soda fountain" ice cream truck looks much like a conventional panel-body truck with its sliding door on the curb side. Aside from the separate interior cabinets, the body itself is fully insulated in the sides, ends and roof with 2 in. of "Dry-Zero" insulation. Without cargo, the body weighs 10,800 lb. Only one of these trucks has been built, it having been in operation more than a year.

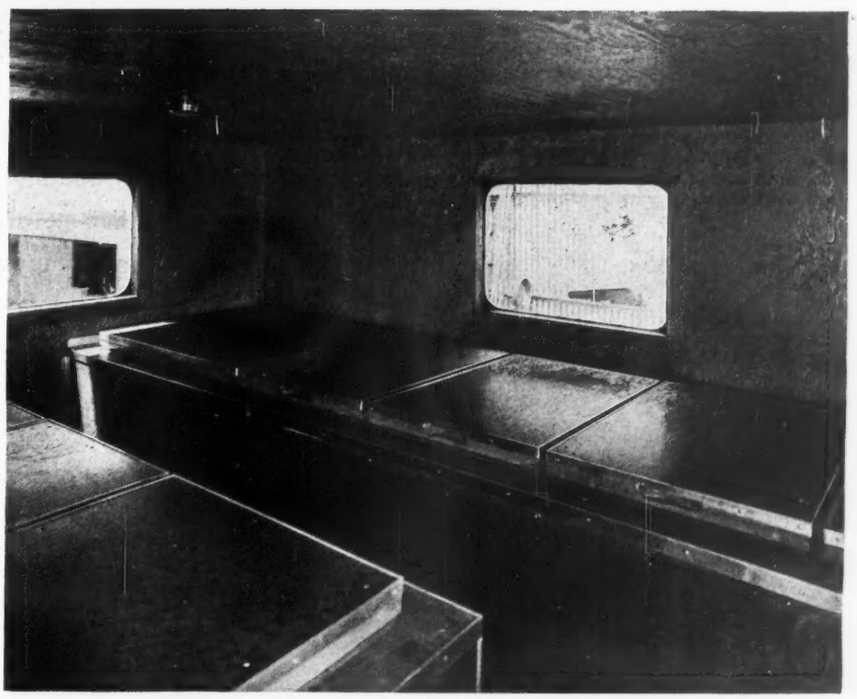
correct flavors wanted and reload the goods. Also, when most of the load in front of the doors has been delivered, the driver has to crawl into the body to reach the ice cream at the far side of the compartment. The same operation is necessary when the truck is fully loaded at the plant.

These operations all take time and delay the driver on his route. The shifting of the load to get the correct flavors at each stop also keeps the doors open for comparatively long periods. This reduces the temperature inside the body and results in soft ice cream unless the refrigerating capacity of the body is ample or the refrigerating unit is of the mechanical or continuously operating type.

It was to eliminate these drawbacks that the new type of body was devised. In it the different flavors are stacked in one or more of the eleven separate cabinets, each with its own cover on the top and each equally accessible to the driver. It is thus much easier to unload and also to load at the plant. The amount of refrigeration required is also reduced since each individual cabinet has its own cover. When ice cream is removed from one cabinet, the others do not have to be opened.

The fact that the door or cover of each cabinet is on the top also helps to conserve the refrigeration since warm air rises and very little cold air is lost when the top covers are removed.

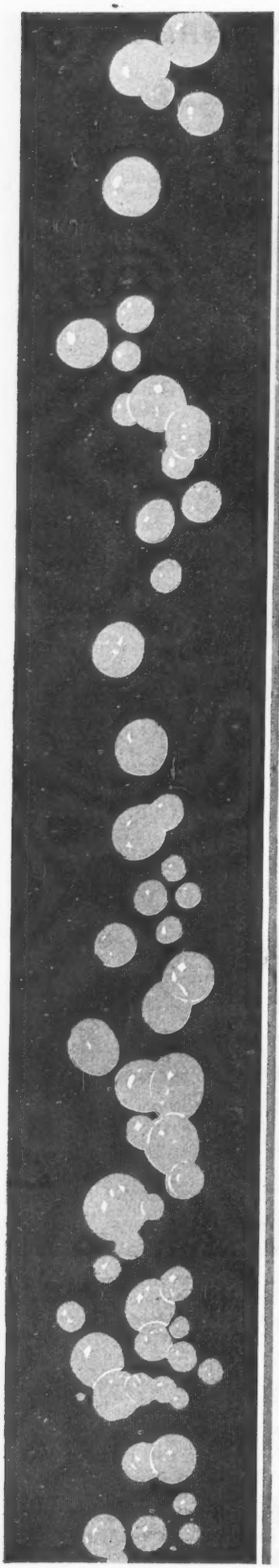
The intent of all of the above is to reduce the cost of refrigeration and to speed up the driver's work on the route as much as 2 or 3 hours on an 8 to 10 hour day. This means longer routes of greater gross volume or fewer trucks for the same territory.



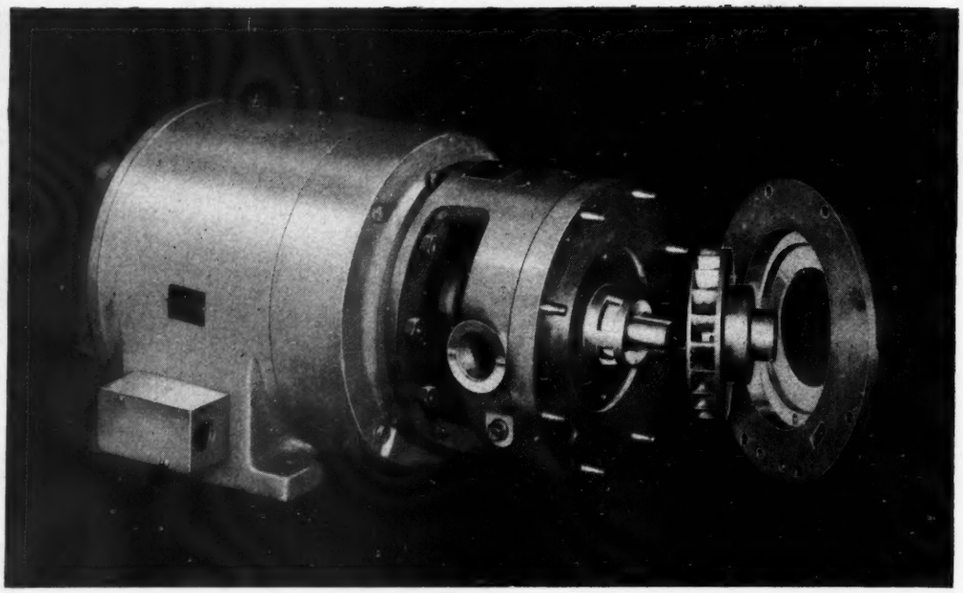
Close-up of the separate interior ice cream cabinets with their individual tops. The aisle between makes each cabinet equally accessible to the driver. Windows on the sides and in the rear provide adequate illumination. The compartments each have a capacity of six, nine or twelve cans of ice cream.

To partially offset these advantages there is the item of the greater cost of the "soda fountain" body as compared with the conventional two- or three-hole job. For a truck of 400-gal. capacity with an old type body costing between $850 and $950 (exclusive of refrigerating means which vary), the cost of the new type body would be from $1,300 to $1,400.

However, over a period of several years, this higher initial cost is more than offset by the increased labor output of the driver and the reduction in refrigeration costs.



ONLY CLEAN AIR CAN REACH YOUR PRODUCT FROM A NASH COMPRESSOR



Here is a compressor designed perfectly to meet the needs of the Food Plants. It is simple, for it has only one moving part, a rotor cast in one piece and rotating in the casing without metallic contact. This means trouble-free operation over long periods. It is compact and requires little valuable floor space. Its oversize ball bearings seldom require attention or lubrication. No lubrication is required in the interior, so that the air is kept clean from the time it enters the pump. • But this is not all. The compressing medium in the Nash Pump is a rotating column of clean water. The air is in intimate contact with this water in passing thru the pump and is actually scrubbed while it is being compressed. Dust present in the atmosphere is removed, and the air delivered free from dirt, oil, or heat, without the use of scrubbers or air washers. Think what this means in terms of purchase cost and floor space occupied by complicated air washing apparatus. • These pumps are proving their worth in the most trying service. They are ideal for transferring beer or wort from tank to tank by air pressure, for maintaining pressure on aging tanks, for supplying compressed air to bottling machines in racking, etc. • Available in any capacity, these pumps deliver pressures up to 40 lbs. absolutely uniform without storage tanks. • You want the most reliable pumping equipment in your plant, so by all means find out more about the Hytor. Our catalog No. 217 is free on request.

THE NASH ENGINEERING COMPANY

243 WILSON ROAD • SOUTH NORWALK, CONNECTICUT

Production Goals Are Set For Important Foodstuffs

Government gets ready to feed additional 10,000,000 in 1942. Processors affected

THE Department of Agriculture has announced official production goals for all major food commodities for 1942, geared to calculations that the United States will be feeding an additional 10,000,000 population next year. While the goals are all set at the farm level, the program vitally affects processors all along the line.

Release of the goals marked the start of a nation-wide campaign by the Department to enlist farms in the job of stepping up production of foods wanted in greater quantity and stepping down production of those where the ratio is top-heavy. Concentration will be on avoiding the ploughing up of millions of acres to get the added output, as was done in the last war.

Secretary Wickard is ringmaster for this vast drive, which is being carried directly to individual farmers on almost a house-to-house basis by state and county USDA defense boards. Four regionals conferences were held during September in Salt Lake City, Chicago, New York and Memphis to speed the work.

"For the first time in the history of agriculture in this country," said Secretary Wickard, "production goals for all essential farm commodities have been established. The adjustment machinery of the national farm program will be applied to the whole range of agricultural commodities to assure plenty of the commodities for which there is increased need while continuing to hold in check the production of commodities of which we already have large reserve."

Prime use of this "adjustment machinery" will be continuation and expansion of Surplus Marketing Administration's price-floor policy to maintain at least an 85 percent parity price on the commodities for which the department is seeking increased production. Since passage of lend-lease, SMA has been pledged to maintain minimum prices on hogs, dairy and poultry products. These minimums now, by formal action, have been changed to the fluctuating (upward) level of 85 percent of parity, and other products are sure to be added to the list.

The government program calls for an increase of 15 percent in the output of food commodities, according to a statement by Secretary Wickard at a conference of Department of Agriculture agents and farm organization leaders at Chicago on September 18. And at a press conference he said that the Department would have at its disposal one billion dollars of lend-lease funds with which to carry out its guarantee that farmers get a good return on the commodities in which production increases are sought.

Mr. Wickard stated that commitments have been made for supplying food to Great Britain through June 30, 1942. And in that period the British will need a supply of cheese, evaporated milk and dry skim milk that will require the processing of four and a half to five billion pounds of fluid milk. They will also need a billion and a half pounds of pork and lard, about 500,000,000 dozen eggs and 18,000,000 lb. of poultry meat.

1942 Food Production Goals

(With comparisons with earlier years to show how much added output is entailed.)

Commodity	1936-40 Average	Estimates, 1941	1942 Goal
Milk (lb.)	106,640,000,000	116,809,000,000	125,000,000,000
Eggs (doz.)	3,400,000,000	3,676,000,000	4,000,000,000
Hogs (head)*	63,196,000	71,000,000	79,300,000
Beef, veal (head)*	24,850,000	25,100,000	28,000,000
Chickens (number)*	644,000,000	680,000,000	750,000,000
Lamb, mutton (head)*	21,902,000	22,400,000	22,900,000
Corn (acres)	93,980,000	87,363,000	90,000,000
Oats (acres)	36,992,000	38,197,000	40,000,000
Barley (acres)	12,881,000	14,813,000	14,500,000
Cotton (acres)	27,858,000	23,519,000	23,000,000
Wheat (acres)	72,049,000	63,503,000	55,000,000
Peanuts (acres)	1,736,000	1,908,000	3,700,000
Soybeans (acres)	3,433,000	5,550,000	7,000,000
Sugar (acres)	.....	1,085,000	No Limit
Rye (acres)	3,533,000	3,436,000	3,450,000
Rice (acres)	1,047,000	1,186,000	1,200,000
Dry beans (acres)	1,880,000	2,220,000	2,220,000
Potatoes (acres)	3,132,000	2,988,000	3,060,000
Sweet potatoes (acres)	836,000	843,000	850,000
Commercial vegetables			
Fresh use (acres)	1,824,000	1,843,000	1,935,000
Processed (acres)	1,319,000	1,487,000	1,500,000

* Figure in each case indicates number of head of livestock for slaughter.

Shipping Containers Short

AN ACUTE SHORTAGE of shipping containers, both paper and wood, is reported to have developed in the apple industry. Apple growers have been working with American Association of Railroads in an attempt to solve the problem, but have met with little success.

Court Voids Exemption

EXEMPTION of workers in sugar mills as agricultural employees from the wage and hour provisions of the Fair Labor Standards Act seems to be contrary to a prevailing appellate court decision, Administrator Fleming warned the industry on September 15.

OYSTERS R

Everyone knows there's an "r" in September and that the oyster season starts in that month. But to make it official and, incidentally, to give the oyster a little publicity, a formal opening of the season was held in Washington, D. C. And on that occasion, John J. Dempsey, Under-Secretary of the Department of the Interior, got a little assistance from pretty Interior cafeteria waitress Dorothy Winters.

Food Shipments to England Placed at $190 Million

President says $399 million worth of food has been delivered for export to Britain

THE FOOD INDUSTRY is earmarked to provide roughly $350,000,000 worth of commodities for Great Britain and other embattled democracies from the first lend-lease appropriation of seven billion dollars, the President's report to Congress disclosed officially. The report was sent to the House and Senate in September, in compliance with the statute's requirement for a periodic public accounting.

The report discloses that virtually the entire first appropriation (a second was sent to Congress in September) was allocated by Aug. 31, that more than half the funds had been obligated by contracts. Deliveries and shipments, while increasing sharply month by month, naturally lag behind—as of August 31 deliveries totaled roughly $399 millions and exports $190 millions.

In many ways, of course, the report is somewhat generalized to protect military information. The President, however, selected foods as an illustration of the extent of American aid and provided Congress with detailed figures of exports of various commodities. Table I shows the volume of foodstuffs to be obtained from the first lend-lease appropriation, the amounts under contract and the amounts delivered as of August 31.

The President, using food as an example of help which already has been sent abroad, reported that "hundreds of thousands of tons of food have gone safely across the North Atlantic to maintain the health and stamina of British working men and British soldiers." Some of the more important items delivered through August 31, the President reported, were as listed in Table II.

TABLE II

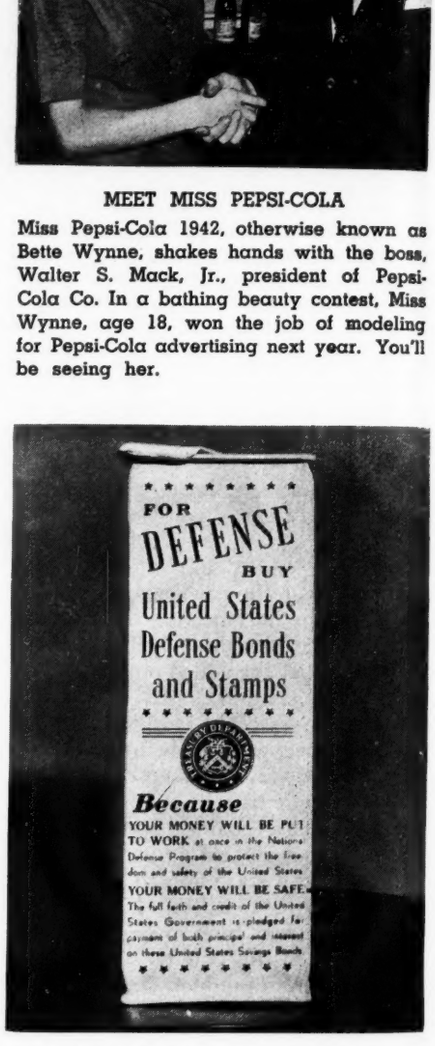
Cheese	44,538,120 lb.
Dried eggs	2,877,317 lb.
Frozen eggs	23,124,750 lb.
Dried skim milk	12,590,617
Evaporated milk	2,957,796 cases
Canned meat	21,541,281 lb.
Cured pork	89,741,480 lb.
Dried beans	110,948,900 lb.

TABLE I

	Allocations	Obligations	Expenditures
Dairy products and eggs	$98,373,500	$62,790,066	$33,921,408
Meat, fish, fowl	121,048,300	66,900,300	26,367,807
Fruits, vegetables, and nuts	83,306,000	26,011,812	12,107,641
Grain and cereal products	10,438,500	7,728,312	4,774,213
Sugar, chocolate, and saccharine products	263,800	245,800	180,313
Lard, fats and oils	29,150,000	16,164,945	11,784,428
Other, unclassified	12,795,000	4,213,643	981,775
Totals	$335,375,700	$184,054,880	$90,117,587

MEET MISS PEPSI-COLA

Miss Pepsi-Cola 1942, otherwise known as Bette Wynne, shakes hands with the boss, Walter S. Mack, Jr., president of Pepsi-Cola Co. In a bathing beauty contest, Miss Wynne, age 18, won the job of modeling for Pepsi-Cola advertising next year. You'll be seeing her.


FOR
DEFENSE
BUY
United States
Defense Bonds
and Stamps
Because
YOUR MONEY WILL BE PUT TO WORK at once in the National Defense Program to protect the freedom and safety of the United States.
YOUR MONEY WILL BE SAFE.
The full faith and credit of the United States Government is pledged for payment of both principal and interest on these United States Savings Bonds.

MILK SPEAKS FOR DEFENSE

"For defense buy United States bonds and stamps." This patriotic message is being sent into millions of homes by milk companies which are distributing milk in paper containers. Dairy Sealed, Inc., New York, one of the Borden group, already has printed the message on 8,000,000 containers, which is only the beginning.

Scientists Disclose Facts About Vitamins

NEW INFORMATION on vitamins was reported at the symposium on the biological action of vitamins held at the University of Wisconsin and the University of Chicago. Vitamin C, according to Prof. Paul H. Phillips, University of Wisconsin, plays a vital role in reproduction. Prof. Phillips reported that while vitamin C might not be regarded as a rejuvenation vitamin, it promised to be useful in postponing the effects generally associated with senescence.

Riboflavin prevents and cures a certain type of blindness in animals and man, and is one of the essential food factors which protect rats against a chemical causing cancer of the liver, according to experimental results reported by Dr. Paul Gyorgy, Western Reserve University.

A new member of the vitamin B group was announced by Prof. Roger J. Williams, of the University of Texas. Called "folic acid" because of its abundance in leaves, it has been found to affect the growth of microorganisms and yeast. Prof. Williams also reported that the absence of pantothenic acid in the diet of pigs causes, among other symptoms, a nervous malady which makes the pigs walk in a goose-step.

OPA Confuses Trade With Fats, Oils Curb

PRICE ADMINISTRATOR HENDERSON late in August endeavored to eliminate speculative practices in the fats and oils field. A number of announcements and interpretations were issued as confusion followed the first statement. It was Administrator Henderson's purpose to "eliminate speculative practices involved in the purchase or sale of physical quantities of fats and oils. It was not designed to interfere in any way at the present time with the operation of the futures market." A further caution was added, however, that futures market activity must not create an artificial influence on prices, or some trading limits may have to be imposed.

In regard to setting ceiling prices on this season's run of cottonseed oil, Mr. Henderson made the statement: "That ceiling action on cottonseed oil which did not extend to competitive fats and oils would be unwise and also discriminatory."

Off-Flavor Milk Low In Vitamin C Content

Loss of vitamin C content is one of the changes in milk that accompanies development of "oxidized flavor" according to J. Malcom Trout of Michigan State College. In reviewing the results of studies on "oxidized flavored" milk for the Chicago Society of Dairy Technologists. Mr. Trout cited loss of vitamin C along with other peculiarities of "off-flavored" milk. Among these peculiarities are (1) low bacteria count, (2) high titratable acidity, (3) copper contamination and (4) low carotene content.

Army Diet May Change Future Food Demands

FEEDING 1,400,000 men three times a day on a diet better than that of most of the people in the United States will make a difference in the civilian food purchasing in the future. That is the prediction made by Col. R. A. Osmun, head of the public relations branch office of the Quartermaster General, Washington, D. C., to representatives of the business press in Chicago.

Quantity of Food Going To England Called Small

Placed at 5 percent of consumption by observers just arrived from Britain

THE VOLUME of lend-lease food now going to England is supplying not over 5 percent of the population's food consumption. Best estimates of those recently arrived in this country from the other side are that total shipments through the summer, on a tonnage basis, were about two and one-half day's supply.

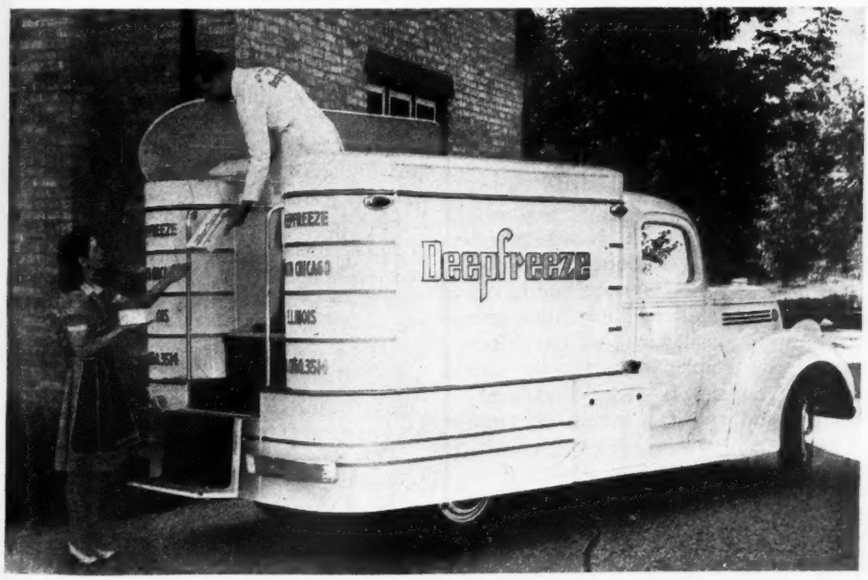
At present, American lend-lease food is being distributed by the British government through regular marketing channels. It is being sold to ultimate consumers by retail stores, under the rigid price controls over both mark-up and retail prices in effect on foodstuffs and many other commodities.

This system of selling lend-lease supplies has caused some complaint, both from British and American quarters. There is a reason, however. The Food Ministry points out that to set up a separate distribution system would be too expensive for the volume of American foodstuffs which are arriving. Plans are being made looking toward ultimate free distribution, however, as soon as the volume makes this possible.

All of the supplies which have arrived have been in good condition except one shipment of eggs which apparently spoiled because of delays at the unloading port, congested by arrival of a large convoy. When the "bad egg" shipment became known, the British government politely stated they were Canadian eggs.

There is no acute shortage of food in Britain, although quantities are not liberal. Ration cards frequently do not provide sufficiently for heavy workers, such as dock employees. Instances of these workers making a lunch on bread and jam, or margarine, are numerous. Milk also is seriously short for the entire population. First steps toward government distribution of lend-lease food may be to give heavy workers an extra ration through canteens and to segregate American dried milk supplies for free distribution throughout the country.

As is generally known over here, reports from the other side state that dried milk, dried eggs, fruit and tomato juices, bacon and pork products are most urgently needed. The recent start toward a huge increase in egg drying capacity in this country will have to be duplicated in the milk drying field to supply Britain.



BELOW ZERO ON WHEELS

This new frozen food delivery truck has two sections of food compartments with a catwalk between. In each section is a battery of four "Deepfreeze" cold cylinders in which sub-zero temperatures are maintained by small gasoline compressors. This unit has a 36-cu. ft. capacity; a cab-over-engine type has a capacity of 77 cu. ft. The unit was designed by the Deepfreeze Division of Motor Products Corp. and manufactured by Henney Motor Co., Freeport, Ill.

Repair Priority Plan Is Revised

Simplified scheme replaces the original one issued Aug. 8. Applies to food industries

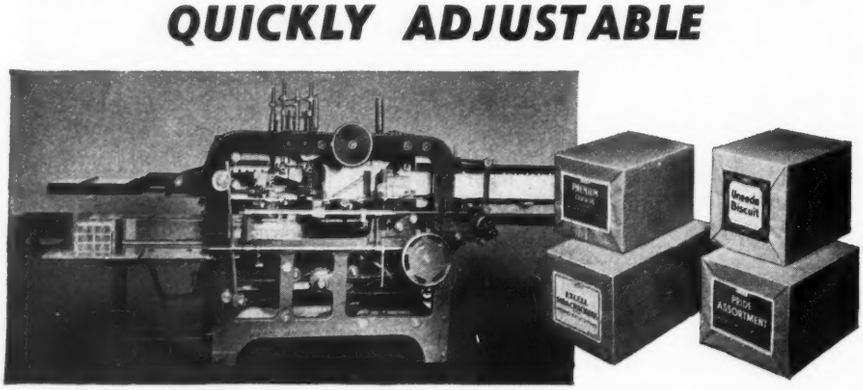
A REVISED and simplified priority plan for insuring uninterrupted operation of essential defense and civilian industry was issued in September, replacing the original repair and maintenance system issued Aug. 8 and withdrawn without going into effect. It applies to food processing and 19 other industries.

The new order provides an A-10 rating both to purchases for repair work and for "emergency inventory"—minimum inventory required to meet actual or imminent breakdown of property or equipment. Its application is entirely automatic; eligible companies simply endorse all orders which qualify for the assistance with this statement: "Purchase Order for Repair or Emergency Inventory Preference Rating A-10 under Preference Rating Order P-22."

Handling the BIG FELLOWS

NEW Bundling Machine for extra large sizes

QUICKLY ADJUSTABLE



The F-10 handles all four sizes of the National Biscuit Company bundles shown here.

●

Striking Savings

1. Kraft or other strong paper used by bundling machines costs less than made-to-order containers or boxes.
2. Bundling paper weighs one-third as much as boxes—reducing transportation costs.
3. A bundling machine requires but one operator to do the work of many packers.
4. Bundling machines require only one-half of the floor space needed for hand packing.

We've just introduced a new Model F-10 bundling machine, designed especially to handle large size bundles. And there's real economy in bundling the big ones.

Quickly adjustable for various sizes, this machine produces neat, securely wrapped bundles within the following dimensions: 20″ to 7½″ in length; 13¼″ to 6″ in width; 9″ to 4″ in height. Packages may be bundled in dozen lots or in any desired quantity coming within the size range of the machine.

The F-10 uses Kraft or other strong paper which is fed from a roll and automatically cut to size by the machine. Applies separate end-labels on both ends of the bundle and holds folds and end-labels in position until the glue has thoroughly dried. Speeds from 8 to 24 bundles per minute, depending on size of bundle, arrangement of packages and speed at which operator can feed.

Write for full information on the F-10

PACKAGE MACHINERY COMPANY, Springfield, Massachusetts
NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO
Buenos Aires, Argentina: David H. Orton, Maipu 231
Peterborough, England: Baker Perkins, Ltd.
Melbourne, Australia: Baker Perkins, Pty., Ltd.

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

Rye, Soy, Flour Standards Heard

Suggestions made on rye flour. Soy flour defined. Proposed standards to be prepared

RYE AND SOYBEAN FLOURS were the subjects of two Standards Committee meetings on September 11 and 12. Only about a dozen people were at each of these meetings.

The Millers' National Federation offered specific proposals for rye flours at the first meeting, under the direction of Herman Fakler, vice-president. These were as follows:

1. That a definition and standard of identity for rye flour be formulated which will include within its provisions the commercial types of rye flour now designated as rye flour.
2. That a maximum permissible moisture content be established at 15 percent, determined by the present AOAC official vacuum oven method.
3. That a reasonable bolting requirement, to be used in the milling of rye flour, be provided similar to that contained in the definition and standard of identity for wheat flour, although the specific sieve opening size will have to be adjusted appropriately to rye flour milling requirements.
4. That a protein minimum be omitted because it has no value.
5. That no ash maximum be provided unless the maximum is made high enough to provide adequately for the dark rye flours which are in demand.
6. That the bleaching of rye flour as generally practiced at present be provided for in substantially the same language as contained in the definition and standard of identity for wheat flour.

It was pointed out that since rye flours are sold almost exclusively on the basis of their color, variations in ash and protein analyses may be wide within any one color range. For this reason, it was suggested that standards not be established which would control both chemical analyses and the color designations which are now in use.

Rye meals and related specialties were also discussed briefly by members of the Federation. This part of the rye milling business was described as being largely "prescription business." No proposals for rye meal standards were made.

The Soy Flour Association took the lead in proposing standards for soy flour; splits or kernels or meats; grits or flakes; and raw soybean flour. This presentation was under the direction of H. A. Olendorf, president, at the September 12 meeting. Typical of the proposals was the following paragraph:

"SOY (SOYA) (SOYBEAN) FLOUR is the food prepared by grinding debittered and dehulled clean, mature, sound, yellow soybeans of a quality current in the season's production. The flour is free of rancidity

and contains not more than 10 percent moisture, and not more than 3 percent crude fiber. It may contain part or all the fat of the dehulled soybean. The finished flour is of such fineness that not less than 95 percent passes through a cloth having openings not larger than those of No. 100 woven wire cloth as defined in 'Standard Specifications for Sieves' published March 1, 1940, by the U. S. Department of Commerce, National Bureau of Standards."

Proposed standards for both rye and soybean flours will now be drawn up by the Food Standards Committee, and announced as a new docket in the series of food standards. Early action is anticipated so that standards for rye and soy flours may promulgated soon after the effective date of the other flours which have been standardized under Docket No. 21.

University Studies Vegetable Drying

THE EFFECTS of various methods and lengths of blanching, drying temperatures, air velocities and other factors on the quality of dehydrated vegetables have been studied at the University of California.

One of the most important factors in success is the blanching of the prepared raw vegetables in live steam for a long enough period to destroy enzymes responsible for undersirable changes in flavor, texture, color and odor of the dried product. Thorough steam blanching also partially precooks the vegetables and makes the subsequent cooking of the dried product rapid. Unblanched dried vegetables soon develop hay-like flavors and odors and are extremely tough.

Finely sliced or shredded vegetables dried much more rapidly than those cut in thick slices or cubed.

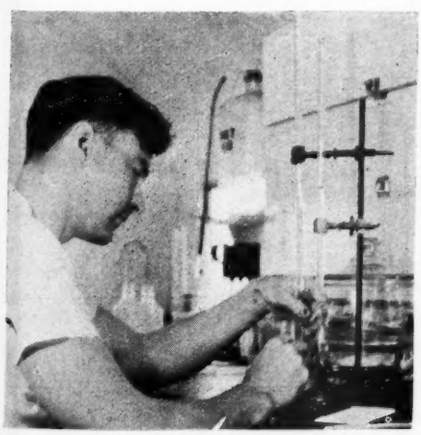
Steam blanching removes very little of the soluble vitamins, minerals, sugars and other water soluble food values; blanching in hot water results in extensive loss of these values.

High air velocity, at least 500 linear feet per minute and low humidity of the air used in drying were found very desirable.

Packages must be insect-proof and moistureproof if for use in the field or on board ship. Insects were found to be voraciously fond of dried vegetables and willing to eat holes in cartons to reach them. Absorption of moisture causes rapid deterioration in color, flavor and odor. Cans appear to be the most satisfactory containers. For the civilian trade the aluminum foil-Pliofilm, bags now used for dried vegetable soup mixtures and for chicken noodle soup would be satisfactory. Whether they would stand the rigors of Army field conditions is a question.

Only strictly fresh vegetables of highest quality should be used for drying.

The investigation is under the direction of W. V. Cruess and E. M. Mrak. The work is still under way.



RESEARCH ON CHEESE

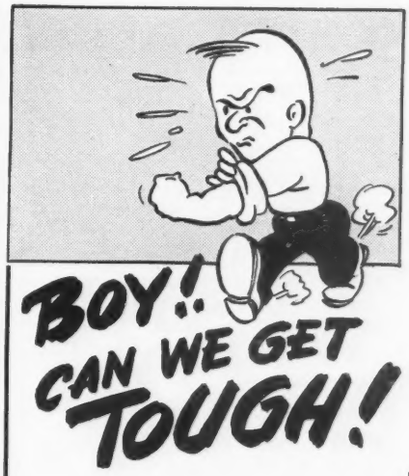
Arthur M. Swanson, Borden technologist, making tests on Swiss-type cheese in one of the two trailer laboratories belonging to the U. S. Department of Agriculture and stationed at the Preston cheese factory near Juda, Wis. Working with Mr. Swanson is Fred Feutz, Swiss cheese specialist of the Bureau of Dairy Industry. Also assisting in this job of learning how to make better Swiss-type cheese is the University of Wisconsin college of agriculture. The findings will be made available to the entire foreign-type cheese industry.

New Technic Employed At Hearing on Oysters

OYSTER PACKERS were catechized at an open meeting of the Food Standards Committee held on September 10. A prepared list of specific questions was distributed by the Committee to all present at the meeting, and served as the basis of discussion. The technic differed from the usual Food Standards Committee meeting at which industry representatives submit proposed standards and questioning follows the proposals. At the hearing on shucked oysters no industry proposals were made, so the meeting began with questions.

Discussion centered largely on the use of fresh water in shucking pots and in "washing, rinsing, blowing or otherwise cleansing" the oysters. Limitation of time of exposure to fresh water and use of brines of various concentrations also were questioned, the hope being to minimize swelling of oysters. Size classifications were discussed, principally in terms of count per gallon. The range for each size designation and methods of restricting variations within each range were sought.

The purpose of this informal meeting was to obtain information for the



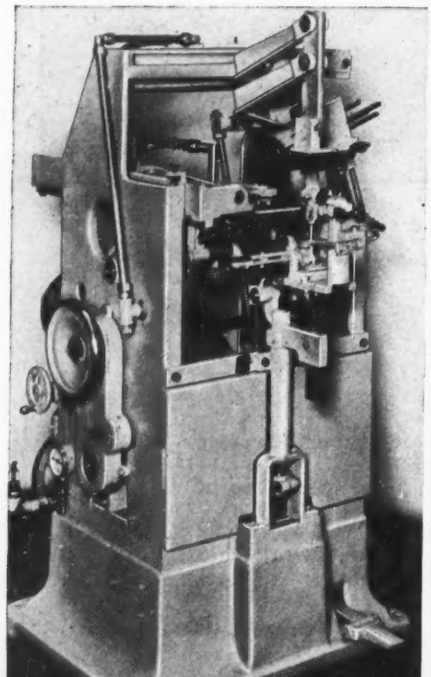
The men here at Viking are a pretty peace-loving lot. They work hard, like to picnic, to boat and fish on the river, to go for long drives with their families. But let a national emergency pop-up, like the one we've got now, and they can get tough in a hurry.

We've watched our men bend a little closer to their lathes, we've seen them sacrifice leisure time for overtime, we've caught the seriousness of their attack upon a casting, an assembly job, a shipping crate. They know that in their efforts is America's answer.

In comparison with the big, sprawling airplane factories and booming steel mills, our job seems sorta small and insignificant. But to all of us here at Viking it's the most important thing we've ever done.

VIKING PUMP CO.
CEDAR FALLS, IOWA

WORLDS Ahead



THE WORLD MODEL CH SEMI-AUTOMATIC LABELER

If your labeling calls for steady, efficient, accurate application of single labels to a variety of container sizes and shapes, it may prove well worth your while to look into the WORLD Model CH Semi-Automatic Labeler.

This sturdy, compact, easy-to-operate Upright Model CH applies single labels from postage stamp size up to 6" square to every size and shape of container up to 4" in diameter.

Find out just how the WORLD Model CH can save you money while providing you with better labeling. For all the facts and figures simply send us a complete set of your labeled containers.

ECONOMIC MACHINERY CO.

WORCESTER, MASSACHUSETTS

Food Standards Committee. As the result of this discussion, a proposed definition and standard of identity will later be announced for formal public hearing as one of the dockets in the series of food standards.

Sweetener Battle Decision Delayed

Action put off on suit against standard which permits use of dextrose with label statement

A DECISION has apparently been reached by the officials of the Federal Security Agency not to issue at this time a tentative order on the standards of identity for canned fruits. This means that an answer to the sweetener controversy will not be reached as soon as expected.

It will be recalled that as a result of an early standard of identity (Docket No. 5), suit was brought by the cane sugar refiners in the Second Circuit Court of Appeals protesting the use of dextrose in canned fruits without label declaration. Prosecution of this court case was postponed by announcement of the reopening of this subject under a new docket number (No. 23). It is the order resulting from Docket No. 23 that was awaited before deciding whether to press the court action. On September 15 action on the court case was again postponed for four months.

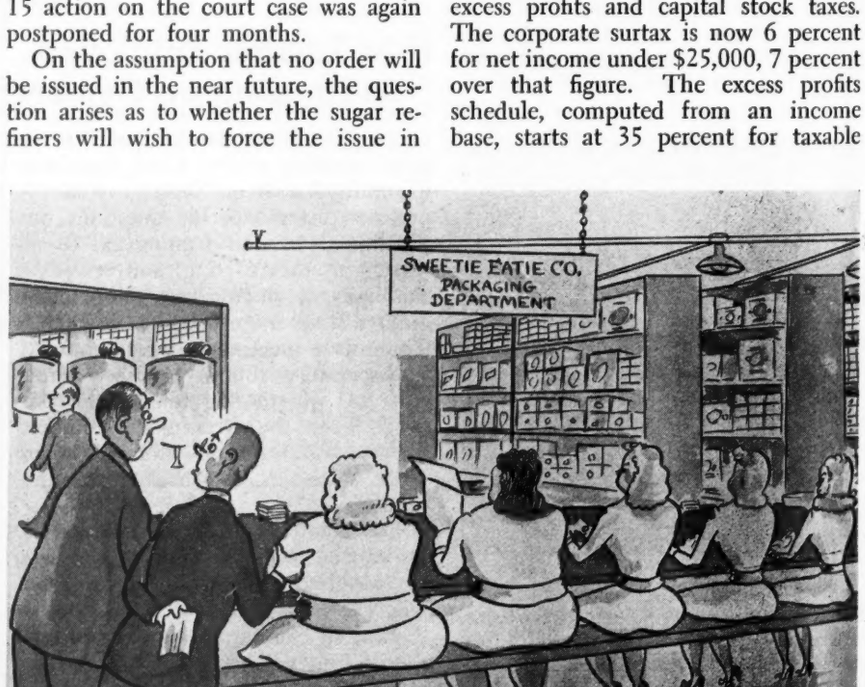
On the assumption that no order will be issued in the near future, the question arises as to whether the sugar refiners will wish to force the issue in court. Well-informed observers are inclined to think that they will not, for two reasons. In the first place, the sugar refiners are selling all the sugar they can get at present, and the prospect for getting more sugar is not all that might be desired. In the second place, the sugar refiners are said to fear that if a decision is forced it will be in favor of the corn sweeteners. No decision is better than an adverse decision, they think.

Enforcement of the canned fruit standards pending the outcome of this controversy is continuing on those features which are not at issue. Label declaration of other optional ingredients and quality and fill standards are being policed by the Food & Drug Administration as usual.

Levy on Soft Drinks Deleted from Tax Bill

THE soft drinks tax proposed to Congress by the Treasury for the 1941 tax bill and approved by the House was stricken from the measure in the Senate. The Senate version of this section was accepted in the conference report so the bill was signed by the President without this provision.

The levy on fermented malt beverages is increased in the tax law from $5 to $6 per barrel. Affecting all industry are the increases in corporate, excess profits and capital stock taxes. The corporate surtax is now 6 percent for net income under $25,000, 7 percent over that figure. The excess profits schedule, computed from an income base, starts at 35 percent for taxable



"I'd say the loss started about here."

SCHEDULE OF EVENTS

OCTOBER

6– 7—Boston Conference on Distribution, Hotel Statler, Boston.
8–10—American Oil Chemists Society, annual fall meeting, Drake Hotel, Chicago.
12–15—American Bakers Association, Hotel Statler, Boston.
12–19—National Wine Week.
14–17—American Public Health Association, Convention Hall, Atlantic City, N. J.
16–18—National Association of Retail Ice Cream Manufacturers, Hotel Niagara, Niagara Falls, N. Y.
20–22—International Association of Ice Cream Manufacturers, King Edward Hotel, Toronto, Canada.
20–25—Dairy Industries Exposition, Toronto, Canada.
23–25—International Association of Milk Dealers, King Edward Hotel, Toronto, Canada.

NOVEMBER

5– 7—Associated Grocery Manufacturers of America, Waldorf Hotel, New York.
10–12—National Cooperative Milk Producers Federation, Congress Hotel, Chicago.

profits up to $20,000 and steps up in 5 percent jumps to 60 percent for taxable income of $500,000 or more. On the invested capital base, a return of 8 percent is permitted before excess profits for the first $5,000,000 of capital, 7 percent return on the remainder. The capital stock tax is hiked from $1 to $1.25.

Action Taken on Some Standards

Oysters, rye and soy flour, macaroni, dried milk, farina and oleo are involved

ASIDE FROM the open meetings of the Food Standards Committee to consider shucked oysters, rye flours and soy flours, there were no standards hearings during the past month. An account of these open meetings is found elsewhere in these pages. However, a new docket was announced in the *Federal Register* of August 29 for standards of identity for macaroni, spaghetti, vermicelli and noodles. The hearing, to begin September 29, was postponed to October 6.

Announcement of the reopening of the sweetened condensed milk standard is expected. It has been rumored, incorrectly, that additional data might be presented directly to the Administrator by the A. E. Staley Co., following the court decision announced last month (FOOD INDUSTRIES, September, 1941, page 69).

This additional evidence must be presented at a public hearing. Hence, the usual procedure for a new docket will be followed.

The common or usual name "dried skim milk" was supported by the courts,

. . . but his thumb got stuck in the ball!

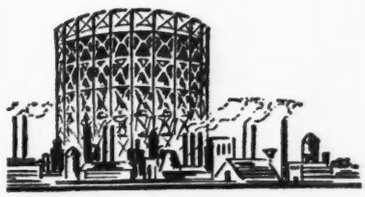
Charlie's aim was deadly. His wind-up was something to behold. His reputation never failed to pack the gallery.

And now . . . all made futile by a detail . . . the size of a hole in the ball!

No doubt Charlie burned with chagrin, but *he* got another chance. For America, there will be no other chance. Collectively, American industry must produce needed armament . . . or else.

And armaments include more than guns and trucks and planes, for *food* plays second fiddle to no item of defense, the girder-upper of the inner man, ultimate source of all the other sinews of war! Thus, if heating processes . . . roasting, toasting, high-temperature cooking, drying, can-making, . . . are the thumbhole of *your* production ball, Kemp can help you get it rolling.

Kemp can give you faster heating, more accurate control and drastic reduction in fuel costs, *no matter what equipment you are now using!*



This, you will realize, is a pretty hard-boiled claim. Why not call us on it? Address The **C. M. Kemp Manufacturing Company, 405 East Oliver Street, Baltimore, Md.**

KEMP of BALTIMORE

Editors of FOOD INDUSTRIES SAY:

"Production of processed foods is heading for a new high. Dairy products plants, canners and other food manufacturers are being called upon for more and more production. The reason is primarily to supply food for Britain under the Lend-Lease Act. Aiding this demand is a somewhat increased per capita food consumption resulting from feeding the armed forces."

Increased production means EXTRA vigilance to maintain required sanitary standards!

And you can do this MORE EASILY with TESTED Oakite Cleaning!

With efficient sanitation procedures so necessary in maintaining QUALITY CONTROL, more food plants are relying on Tested Oakite cleaning and germicidal materials. That is because they make cleaning of ALL food mixing, processing and handling equipment EASIER and FASTER! And for curbing bacteria and mold, Oakite Bactericide provides a MORE ACTIVE form of available chlorine that brings QUICK death to harmful organisms.

Now Is the Time to Act!

Find out how Tested Oakite cleaning and germicidal materials can also HELP you more effectively safeguard your products against bacterial contamination and spoilage losses . . . help you increase sanitation efficiency and LOWER cleaning costs. Since there is no obligation, won't you write today?

OAKITE *Tested* **CLEANING** FOR QUALITY CONTROL

Complete Nation-Wide Service For These Industries

- DAIRY
- CANNED FISH
- MACARONI
- CANNED FRUIT
- SUGAR
- CONFECTIONERY
- REFRIGERATION
- FOOD PREPARATIONS
- FLAVORING EXTRACTS

Manufactured only by

OAKITE PRODUCTS, INC., 26G THAMES ST., NEW YORK, N. Y.

Representatives in All Principal Cities of the United States and Canada

HIGH COMMISSIONER

Malcolm MacDonald, M.P., High Commissioner from the United Kingdom to Canada, will be the principal speaker at the Dairy Congress in Toronto on October 20, opening the week of the dairy industries conventions and the Dairy Industries Exposition there. He is the son of the late Ramsay MacDonald, former British Prime Minister.

as described in a separate item in this issue.

The Quaker Oats Co. late in August entered an appeal against the standards of identity for Farina and Enriched Farina in the Seventh Circuit Court. Land O' Lakes Creamery and the Twin City Milk Producers' Association early in September filed an appeal in the Eighth Circuit Court protesting the oleomargarine standard of identity. Food and Drug Administration enforcement of the latter standard was begun, however, on September 5, the effective date.

Awaited are the final order on dietary foods and tentative orders on habit forming drugs, cream and neufchatel and cottage cheeses, and chocolate products. Also awaited but not expected soon are tentative orders on canned fruits and canned fruit cocktail. These latter are discussed in a separate story in this issue. Expected soon was announcement of a docket to consider toxic spray residue standards.

Oxygen Destroys Vitamin C

WHEN OXYGEN is present in a can or jar of food it combines with the ascorbic acid and thereby reduces the vitamin C content. This was reported in a paper by W. H. Fitzpatrick, J. J. Powers and C. R. Fellers of Massachusetts State College, at the meeting of American Chemical Society last month. Filling the container full, vacuum packing and deaeration help to reduce the amount of oxygen present. Oxygen remaining after the ascorbic acid is destroyed combines with the food tissues, causing an unattractive darkening or browning.

CAPITAL VIEWS

WOMEN WORKERS—Washington is undertaking to promote employment of women workers both in defense plants and in the food industries to release male workers for defense. In many localities, however, there is going to be extensive unemployment of men in the coming winter. They will be thrown out of work as lack of raw materials for customary manufacturing of civilian goods closes or slows down factories. That may create a pool of valuable employees for the food plant. A bit of local cooperation may be worthwhile, both for employers and otherwise idle workers.

HOW LONG AT WAR?—No one knows when a break in the war situation will come. But Washington is planning officially for hostilities through 1943, at least. Food-plant planning to correspond is suggested.

NEW PATENT LAWS—Congress has further restricted patent rights of inventors. Filing of foreign patent applications by U. S. citizens is forbidden without a permit from the Commissioner of Patents. This is intended to prevent the sending of otherwise unpublished information out of the country as an aid to unfriendly nations. Another new law requires that any assignment of a patent must be promptly recorded at the Patent Office in order fully to protect the assignee.

MANDATORY RATINGS—Even informal preference ratings hitherto issued have been made mandatory. Any food manufacturers having orders on which a priority of delivery is expected must now comply with indicated dates, even though they appear merely as "request" on the orders. A most vigorous effort is being made by OPM to enforce full compliance with all priority matters, even those hitherto voluntary in nature.

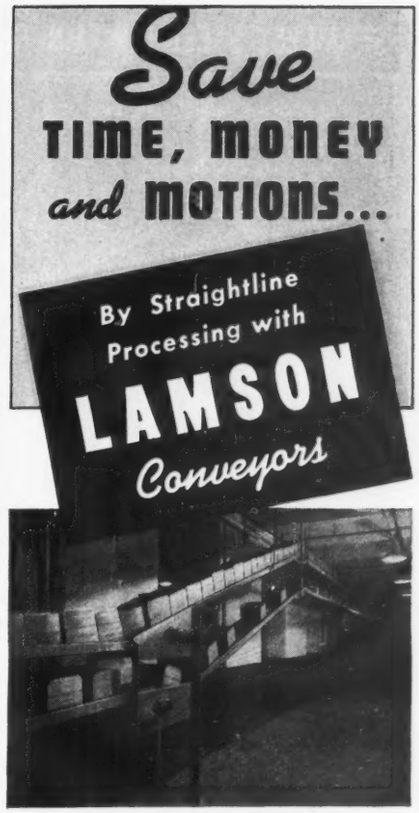
EMPLOYEES' HOSPITAL SERVICE—FSA Chief Paul V. McNutt is organizing a campaign to provide hospital service for employees on a group payment plan wherever this is feasible. The effort is being made partly through the Public Health Service, which is under Mr. McNutt's direction, and partly with American Hospital Association, which has established the Blue Cross plan putting hospital care in the family budget for 7,500,000 Americans. Food plant employers will be urged to put their staffs on such a program, often with some financial aid furnished by the company.

SECOND-HAND DRUMS—Even alcohol may move in second-hand drums under certain circumstances. This is only one of several efforts being made to relieve the pressure on metal supplies for container manufacture. Food plant executives will probably find it absolutely imperative to organize a program of returnable containers in order to save metal wherever it is physically feasible to do this. Increase in cost, either to shipper or purchaser, will not be an acceptable explanation in Washington as to why such re-use of containers has not been developed.

VARIABLE "PARITY"—Purchasers of agricultural materials are facing a new aspect of the government agricultural program. Parity price for any commodity is defined in part on the basis of the cost of goods purchased by the farmer. Hence, current inflationary price tendencies in industry are boosting the "parity-price" level for the products of the farm. Thus, what many thought were to be ceiling prices protecting the food manufacturer against excessive raw material cost are no longer effective. Probably this fact was one of the most important reasons why the President vetoed the bill which would have barred the sale of government-owned cotton and wheat without specific Congressional act. The Executive and his agricultural department staff want to have these government stocks available to hold at least these two markets somewhat under control if they can.

ANTITRUST WAIVER—Assistant Attorney-General Thurman Arnold assures the Commerce Department that simplification and standardization programs carried out by the Bureau of Standards "will not raise any questions under the Federal antitrust laws." But this trust-buster makes it very clear that the waiver applies only to a very limited type of cooperative plans fixing the number of styles or sizes of goods or packages marketed. Simultaneously, however, a strenuous campaign is being started by OPM further to simplify marketing practices to economize on container materials, especially metals. There is no evidence yet that the two programs conflict. But industrial executives are being warned that regardless of defense conditions there appears to be no let-up in the diligence of the Anti-trust Division of the Department of Justice.

NOW A FOOD WAR—Almost all goods offered for export must get a license before they can move out of the United States. This applies to foods as well as other industrial goods. The intensity of control measures is greatly emphasized by the Soviet-Nazi war condition. The United States proposes by every means to help in minimizing the movement of food into unfriendly hands. The hope, of course, is that Russia will be able to prevent food movement, as well as mineral supply, from its territory to the Nazis. The main comfort to food manufacturers formerly having export markets is the very vigorous aid being given at many points in Washington to the development of new markets in Latin America, where the economic benefits of American commerce are being guided with the objective of both Hemisphere solidarity and increase in the standard of living of the Latin countries.



Two-way Lamson belt conveyor in well-known biscuit company. Top belt brings empty caddies from floor above. Lower belt delivers filled caddies to spiral chute leading to shipping or storage.

● Higher taxes . . . a shorter work week . . . higher wages . . . defense jobs draining the available skilled labor. Month by month, the need for narrowing every production process down to its simplest form becomes more of a dollar-and-cents necessity to every member of the food industry. It's no longer merely a question of "less profits," but often a problem of *staying in business.*

● Lamson engineers are playing a leading role in working out practical solutions to these problems. Their efforts have been outstandingly effective, particularly in the food industry where the cost of moving materials through the plant is often a major part of the total production cost.

● In Lamson conveyor systems, work always moves forward by the shortest, straightest route. Backtracking and cross-handling are entirely eliminated. Process time is reduced by a better coordination of operations. And human motions are simplified, producing a rapid, "endless flow" movement in which every worker and every machine is continuously engaged in productive work.

★ Send today for a free copy of the folder, "The Shortest Road to Profit in the Food Field."

LAMSON CORPORATION
510 LAMSON ST., SYRACUSE, N. Y.

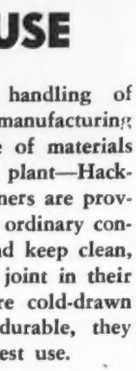
SEAMLESS STEEL CONTAINERS

IDEAL FOR FOOD PLANT USE

IN inter-departmental handling of raw products during manufacturing processes . . . in storage of materials . . . throughout the food plant—Hackney *Seamless* Steel Containers are proving their advantages over ordinary containers. Easy to clean and keep clean, they haven't a weld or a joint in their entire construction—they're cold-drawn to shape. Strong and durable, they stand up under the toughest use.

FURNISHED IN ALL POPULAR SIZES

Hackney Seamless Steel containers are used for holding foodstuffs, liquids, chemicals, ice, etc., as well as for food scraps. They are furnished in all popular sizes—5 to 60 gallons capacity . . . in several types of finishes—galvanized, tinned or black. Write today for complete details . . . no obligation.



Hackney

PRESSED STEEL TANK COMPANY

1349 Vanderbilt Concourse Bldg., New York
208 So. LaSalle St., Room 1573, Chicago
669 Roosevelt Bldg., Los Angeles
1457 So. 66th St., Milwaukee

Containers for Gases, Liquids and Solids

CONSTRUCTION NEWS

	Pending (thousands)	Awarded September (thousands)	Total Awarded 1941 (thousands)
Bakery	$150	$120	$3,890
Beverages	180	665	7,124
Canning and Preserving	40	52	480
Cold Storage Plants	40	40	735
Confectionery	115	.....	243
Grain Mill Products	290	580	6,230
Ice Manufactured	.....	.....	235
Meats and Meat Products	365	280	1,267
Milk Products	300	306	2,357
Miscellaneous	590	425	4,460
	$2,070	$2,468	$27,021

It Is "Skim" Milk

"SKIM" is the common or usual name of the milk product made by separating the cream from whole milk. This, in effect, is the decision handed down by the Eighth Circuit Court of Appeals in St. Louis on September 9. The court supported the government on all counts in the dried skim milk standard appeal, except for omission of a finding of fact that such a standard is "in the public interest." Further promulgation of such a finding is of course a mere matter of formality. The name "milk solids not over 1½ percent fat" as desired by the Twin City Milk Producers' Association and Des Moines Co-operative Dairy will presumably be relegated to the archives by this decision.

Army Buying Hits Snag

THE QUARTERMASTER CORPS asserts that it is having "extreme difficulty" in getting direct bids for its program of buying a year's supplies of canned fruits and vegetables. First invitations on most vegetables have either been rejected because of prices quoted or have resulted in insufficient offers, the QMC reports.

Army Buying Policies Reported at Meeting

POINTERS on Army food procurement policies were heard by members of National Poultry, Butter and Egg Association at their meeting in Chicago. They were told that quality will be the chief factor considered by the Army in the future, with price secondary, but with the low bid on equal quality getting the order. The quality, however, must be in line with the specifications in the procurement orders.

It was also reported at the meeting that the Army is planning an eight-fold expansion in its procurement activities.

An announcement coming through from FSCC during the convention said that all purchases of frozen eggs will be discontinued and purchases confined to dried eggs. O. M. Reed, chief of the Chicago division of SMA said that by the end of this year dried egg production ought to be stepped up to a rate equivalent to 140,000,000 lb. annually. Existing facilities will produce only about 50,000,000 lb. annually.

C. L. Poole Co., of New York, exhibited at the meeting Argentine eggs imported at a cost of less than 25 cents a dozen.

The association elected George H. Toomey, Bartlett Varney Co., Boston, president.

Crops Still at Peak

RUNNING the gantlet of August's usual droughts, floods and disasters, American food crops won through to the September report of the Department of Agriculture's Crop Reporting Board with bumper yields still in prospect.

Total wheat production estimates were again revised upward, this time to 957,563,000 bu. Corn fell off a bit from August figures, but the estimate of 2,523,964,000 bu. is well ahead of the 1940 crop. Barley at 349,596,000 bu. and rice at 60,572,000 bu. are also ahead of both August estimates and 1940 crops. Soybeans, now placed at 110,884,000 bu. compare to 79,837,000 bu. in 1940. Dry beans at 17,545,000 bags are estimated somewhat lower than in August, but show a gain of 1,500,000 bags over 1940. Other important crops are all expected in large quantity.

Canned Food Supplies Adequate for Defense

COMBINED DEMANDS of civilians, armed forces and Lend-Lease for canned foods should be adequately met during the 1941-1942 crop year, according to current estimates of production. While a tight situation will occur in tomato products and canned fish, all other items appear to be available in sufficient abundance.

Needs of the United States defense forces are still not expected to exceed 4 percent of 1941 total packs of fruits and vegetables. Peas, tomatoes, snap beans and corn are the vegetables that will be purchased in greatest quantity, with pineapple, peaches, pears and apricots as the principal fruits.

Lend-Lease purchases of tomatoes have been scaled down from the original figure of 15,000,000 to between 5,000,000 and 6,000,000 cases. With a pack expected to total around 32,000,000 cases, there should be around

26,000,000 cases available to meet U. S. needs, compared to around 30,000,000 cases consumed in the 1940-1941 crop year. As no great shipments of any other canned vegetables are in prospect, and as most 1941 packs will exceed those of 1940, there should be ample canned vegetables for domestic use.

Canned fruits do not enter greatly, as yet, into Lend-Lease purchases. Some canned peaches are being bought and, as the peach pack in California is some 1,500,000 cases below average requirements, peaches will be short. However, canned apricots this year are expected to exceed last year's pack by about 3,000,000 cases and canned pear output is expected to double that of last year.

Fish products are likely to be the tightest among all canned foods. This is not because of short packs, but because the needs of both the armed forces and of Lend-Lease will probably cut supplies available for civilian consumption below normal.

Farm Butchering Mounts

FIGURES recently released by the Bureau of the Census indicate that butchering on the farm is increasing, rather than decreasing, as many had supposed. One of the factors causing this increase is the rapid growth of the refrigerated locker plants, now available in most farm communities.

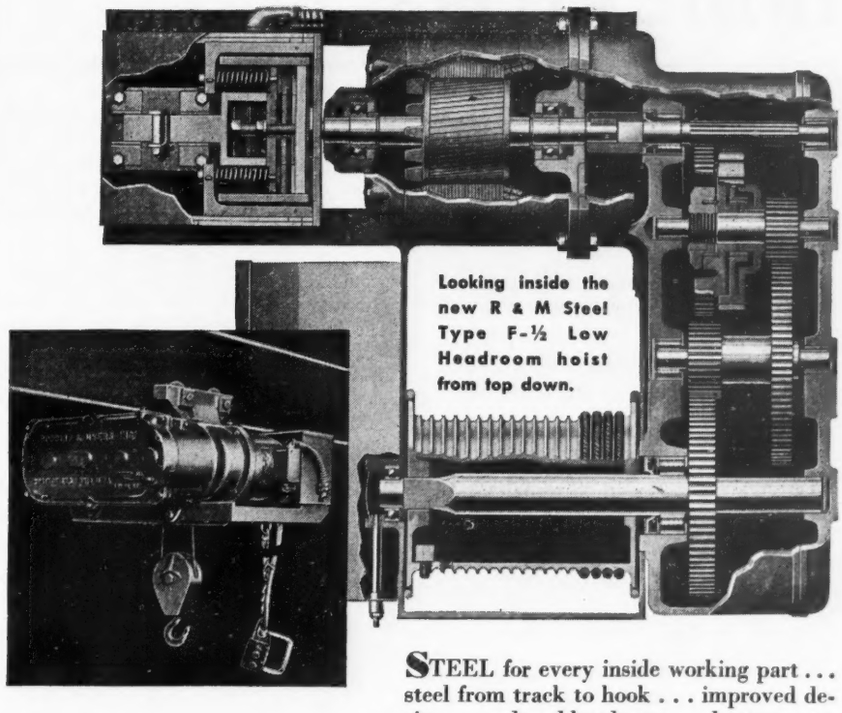
Returns from more than 6,000,000 farms indicate that 1,213,365 cattle and calves were butchered in 1940, compared to 799,991 in 1930. Corresponding figures for hogs and pigs were 13,084,763 and 10,738,502; and for sheep and lambs, 453,145 and 328,231.

Commodity Prices Up For Another Month

STILL ANOTHER MONTH, from mid-August to mid-September, showed a continuation of the steady rise in commodity prices that commenced last December. *The New York Journal of Commerce*'s weekly index of commodity prices, at 93.5 on August 16, had risen to 95.8 by September 13. The same publication's index for grains rose from 81.5 to 88.1 during the period, while its index for foods advanced from 87.8 to 92.1.

Spot prices of commodities were mostly up for the four-week period. Wheat, No. 2 dark winter, Kansas City, rose from \$1.05½ to \$1.13½. Flour increased from \$6.30 to \$6.65 per bbl. Corn, No. 3 yellow, Chicago, upped from 74c to 75½c. Beef fell from 18c. to 17c. in the four weeks, while lamb rose from 20c. to 20½c., and pork loins rose from 23c. to 25c. Lard jumped, going from \$10.15 to \$11.40, with cot-

Here's the "Inside" on the NEW R&M ALL-STEEL HOIST



STEEL FRAME—Main frame made of welded-steel plate, reinforced at "tension" points.

STEEL GEARING—Alloy-steel heat-treated gearing with tensile strength of 278,000 lbs. per square inch.

STEEL TROLLEY—Steel-plated trolley with welded-steel bumpers and safety lugs.

STEEL DRUM—Drum fabricated from steel pipe and steel flanges, jig-welded and machined.

BEARINGS—Roller, ball and bronze bearings used freely where most efficient.

LOAD BRAKE—Oversize, automatic load brake, designed to operate for years without adjustment or wear.

MOTOR—Famous R & M high-torque hoist motor, fully enclosed.

FULLY GUARANTEED—Any part proved defective within one year will be replaced without charge.

STEEL for every inside working part . . . steel from track to hook . . . improved design . . . reduced headroom . . . better materials throughout. Here's your answer to the urgent call for faster output of food products—the new R & M Type F-½ hoist.

You get economy beginning with the purchase price . . . years of continued dollar savings in safe, reliable service, quicker and more efficient handling of raw materials and finished products.

The new R & M Type F-½ hoist is built in 1,000 and 2,000-lb. capacities with pendant, push-button control, all-steel frame, fully enclosed working parts, and can be equipped with special trolleys to fit all types of monorail.

Get further "inside" facts on this remarkable new R & M steel hoist by contacting your nearest R & M special food hoist distributor listed below. Or write the factory direct for Bulletin No. 800, advising us on the type of service the hoist is to perform. It will pay you to "take it up" with R & M.

SPECIAL R&M FOOD HOIST DISTRIBUTORS

Berlin Chapman Co. . . . . Berlin, Wis.
Chisholm-Ryder Co. . . Niagara Falls, N. Y.
Dunkley Co. . . . . Kalamazoo, Mich.
F. H. Langsenkamp Co. . . Indianapolis, Ind.
A. K. Robins & Co. . . . . Baltimore, Md.
Sprague-Sells Corp. . . . . Hoopeston, Ill.

ROBBINS & MYERS, Inc.
HOIST & CRANE DIVISION • SPRINGFIELD, OHIO
MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

tonseed oil keeping company with a rise from 10¾c. to 12½c. Eggs went from 28c. to 30c. and butter from 35½c. to 37c. Cheese also increased in price, rising from 24c. to 25½c. Among the imported foods, coffee rose somewhat, going from 13¼. to 13⅜., cocoa soared from $7.75 to $8.33, and sugar bumped along slightly above the $3.50 government ceiling. Most canned foods were steady except tomatoes, which rose from 75c. to 82½c.

INDICATORS

SALMON PACK in Alaska this year, up to September 6, totaled 6,733,262 cases compared to 4,949,728 cases by September 1 in 1940 and to 5,123,239 cases a year before that date. The all-time high for September 1 was 8,235,285 cases in 1936.

SARDINES from Portugal will be mostly missing from American markets this year, as Great Britain has arranged to exchange 110,000 boxes of tinplate for 1,500,000 cases of Portuguese sardines, practically the available supply.

PACKS of the 12 most important canned vegetables in 1941 are expected to total about 140,000,000 cases, compared to 116,000,000 cases in 1940. With the carryover, the available supply this year is estimated at 145,000,000 cases compared to 128,000,000 cases a year ago.

PACKS of the seven most important canned fruits, including Hawaiian pineapple, are estimated at 31,600,000 cases for 1941.

DRY BEAN CROP in 1941 is now estimated at 1,754,500,000 lb., compared to 1,607,400,000 lb. in 1940 and to an average of 1,329,700,000 lb. in 1930-1939.

SUGAR DISTRIBUTION in the United States, January-July, 1941 inclusive, was reported by AAA at 4,743,985 short tons, raw value, up 900,000 tons over the like period of 1940.

FLOUR PRODUCTION in August, 1941, by mills accounting for 65 percent of United States production, according to *The Northwestern Miller*, totaled 5,605,572 bbl. compared to 5,893,537 bbl. in August, 1940.

FLUID MILK SALES in July, 1941, were reported by Milk Industry Foundation as 5.93 percent greater than in July a year before.

OLEOMARGARINE SALES in July, 1941, as indicated by sales of internal revenue stamps, totaled 31,304,294 lb., compared to 22,800,696 lb. in July, 1940. For the first seven months of 1941, oleomargarine sales were 211,348,858 lb., compared to 179,986,258 lb. in the same months a year ago.

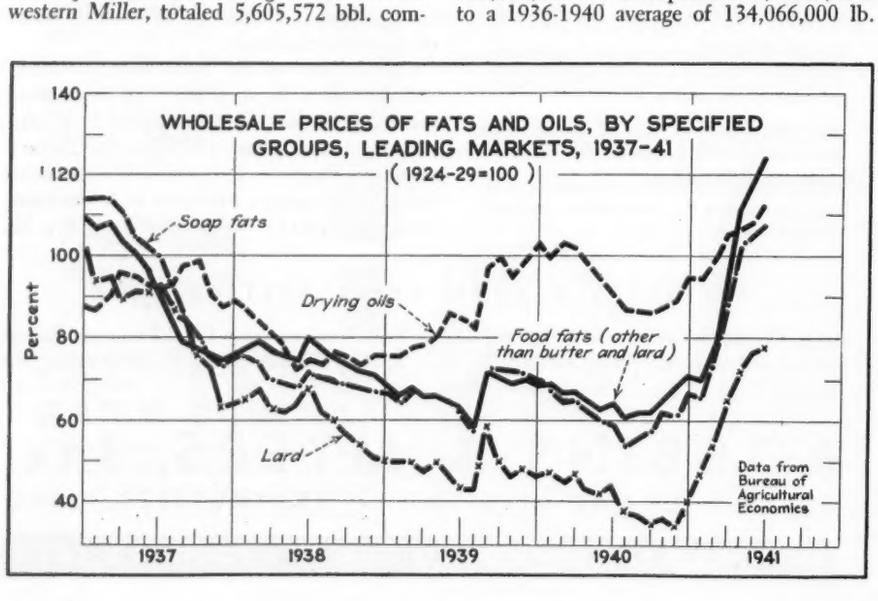
BUTTER, creamery, produced in July, 1941, was 196,685,000 lb., compared to 185,751,000 lb. one year before, and to a July average (1930-1939) of 172,391,000 lb.

BUTTER, creamery, produced in the first seven months of 1941 totaled 1,207,030,000 lb., up 6.7 percent above production in the same months of the preceding year.

CHEESE, American cheddar, produced in July, 1941, totaled 74,950,000 lb., 12.4 percent more than in July, 1940, and 45.4 percent over the 1930-1939 July average.

EVAPORATED MILK PRODUCTION in July, 1941, totaled 299,599,000 lb., an all-time July record, 15 percent above July, 1941, and 41 percent above the 1935-1939 average for July.

FRUITS, frozen, in storage September 1, 1941, totaled 211,047,000 lb., compared to 166,403,000 lb. on September 1, 1940, and to a 1936-1940 average of 134,066,000 lb.



CHEESE, American cheddar, produced in the first seven months of 1941, totaled 405,560,000 lb., an increase of 12.4 percent over the same period of 1940 and up 44.4 percent from the 1930-1939 average for the corresponding period.

EGG PRODUCTION in August, estimated at 8,500,000 cases, was the largest for any August since 1929.

DRIED EGG PRODUCTION, whole eggs, in August was 1,513,787 lb. One year before there was no production recorded for this food commodity.

EGGS, liquid, for freezing, produced in August, 1941, were 38,598,000 lb., up 121 percent from the production of August, 1941.

MILK PRODUCTION, daily, in August, 1941, averaged between 7 and 8 percent above production in August, 1940, while the number of milk cows increased more than 3 percent for the same year.

VEGETABLES, frozen, in storage on September 1, 1941, totaled 83,480,000 lb., compared to 78,378,000 lb. on September 1, 1940.

BUTTER, creamery, in storage September 1 of this year was 200,539,000 lb., compared to 134,266,000 lb. on September 1 last year and to 151,067,000 lb. average for September 1 in 1936-1940.

CHEESE, all kinds, in storage September 1, 1941, amounted to 184,624,000 lb., compared to 149,188,000 lb. a year before and to an average in 1936-1940 of 131,115,000 lb.

EGGS, case equivalent, in storage September 1, 1941, totaled 11,676,000 cases, compared to 11,403,000 cases on September 1, 1940, and to an average for September 1 in 1936-1940 of 10,895,000 cases.

POULTRY, all kinds, in frozen storage on September 1 of this year amounted to 85,276,000 lb., compared to 82,178,000 lb. a year previous and to 65,842,000 lb. average for September 1 in 1936-1940.

MEATS, in cure and frozen storage, all kinds, totaled 625,881,000 lb., on September 1, 1941, compared to 523,390,000 lb. on September 1, 1940, and to an average of 488,278,000 lb., on September 1 in 1936-1940.

LARD IN STORAGE, September 1, 1941, was 282,875,000 lb., and rendered pork fat on the same date totaled 5,338,000 lb. The combined figure for these two products on September 1, 1940 was 272,290,000 lb. and the average September 1 figure in 1936-1940 was 145,589,000 lb.

BUSINESS ACTIVITY INDEX of *Business Week* stood at 154.8 on September 13, 1941, compared to a figure of 157.1 one month before.

COST OF LIVING INDEX of National Industrial Conference Board was 89.4 in August, 1941, compared to 88.9 in July.

AMS Standards

(*Continued from page 61*)

spread from the stalk. "Flowered heads" are those in which the florets are in the flowered stage. "Shattered heads" are tight asparagus heads which have been broken or shattered by mechanical or other means.

ISSUED: August 5, 1941.
EFFECTIVE: September 15, 1941.

Canned Apple Juice

(Tentative)

Canned apple juice is the unfermented juice obtained from the properly matured fresh fruit of the apple tree, which has first been properly treated to remove residual spray materials, and is sufficiently pasteurized or otherwise treated to assure preservation in hermetically sealed containers. Canned apple juice may be either clarified (filtered) or unclarified (unfiltered).

U. S. GRADE A or U. S. FANCY canned apple juice possesses a bright characteristic color and is practically free from defects. The juice tests not less than 12.5 deg. Brix; contains not less than 0.4 percent and not more than 0.65 percent of acid calculated as malic acid; possesses a normal apple juice flavor; and scores not less than 90 points when scored according to the scoring system outlined herein.

U. S. GRADE C or U. S. STANDARD canned apple juice possesses a fairly bright characteristic color and is reasonably free from defects. The juice tests not less than 12 degrees Brix; contains not less than 0.3 percent and not more than 0.8 percent of acid calculated as malic acid; possesses a normal apple juice flavor; and scores not less than 70 points.

OFF-GRADE canned apple juice is apple juice that fails to meet the requirements of the foregoing grades or that falls into the lowest subdivision in any one of the scoring factors.

"Unfermented juice" means that the juice is not fermented and that the finished product contains not more than ½ of 1 percent by volume of ethyl alcohol. "Normal apple juice flavor" means that the product is free from objectionable or off-flavors of all kinds. The percent of malic acid is determined by a method outlined in the standards. The maximum head space allowable in the cans commonly used in packing canned apple juice is also shown in a table in the standards.

The grade of canned apple juice may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (35 points), absence of defects (35 points) and flavor (30 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The factor ABSENCE OF DEFECTS deals principally with workmanship. The presence of particles of apple pulp, seeds and other residue is to be reflected in the scoring of this factor. Grade A juice is practically free from defects mentioned. The juice is grade C if the defects are noticeable but not objectionable. If the defects are decidedly prominent or if the juice shows a decided pulp coagulation, it falls in grade D.

The factor of FLAVOR, relating to the flavor and aroma of canned apple juice, shall be classified from the standpoint of palatability. For example, grade A juice possesses a fine, distinct apple flavor, free from traces of scorching, oxidation, or the flavor of green fruit.

ISSUED: Feb. 3, 1941.
EFFECTIVE: Feb. 15, 1941.

Deleading Maple Sirup

(*Continued from page 53*)

tle show large lead content reductions; but filtered sirups show even greater reductions, and sirups treated with milk show very much greater reductions.

2. Autoclaving of sirups showing turbidity and high lead contents after being filtered did not show a reduction in turbidity nor in lead contents.

3. Clarification of diluted sirups removed as much lead as if the sirups had not been diluted.

4. Clarification of sirups by the methods discussed caused no flavor changes, but did decrease the color intensity slightly.

References

1. G. H. Collinwood and J. A. Cope. Maple Sugar and Sirup, *Cornell Extension Bulletin* No. 397, November, 1938.
2. C. S. Herr. Maple Sirup and Sugar Production in New Hampshire, *University of New Hampshire Extension Bulletin* No. 52, January, 1938.
3. G. H. Collingwood, J. A. Cope and M. P. Rasmussen. The Production of Maple Sirup and Sugar in New York State, *Cornell Extension Bulletin* No. 167, February, 1928.
4. A. Conlin. How to Remove Lead from Maple Sirup, *Food Industries*, Vol. 12, 52, January, 1940.
5. C. O. Willits and C. J. Tressler. Sources of Lead in Maple Sirup and a Method for Its Removal, *Food Research*, Vol. 3, 449, 1938.
6. C. O. Willits, L. B. Norton and C. J. Tressler. Improved Method for Rapid Estimation of Lead in Maple Products. *Journal of the Association of Official Agricultural Chemists*, Vol. 23, 411, 1940.

PRODUCT

Our one product is COLD STORAGE DOORS.

Incorporated in every JAMISON-BUILT DOOR are the results of over 50 years experience by engineers devoting their entire time and energy to this specialty. You benefit. You get better doors per dollar!

Consult our nearest branch or address JAMISON COLD STORAGE DOOR CO., HAGERSTOWN, MD.

Jamison, Stevenson and Victor Doors

Jamison Standard Cooler Door
Ask for Bulletin 122

JAMISON-
BUILT COLD STORAGE DOORS

Where the FOOD INDUSTRY Gets Its STEEL

Ten Well-Stocked, Strategically-Located Ryerson Plants for Prompt, Dependable Service

Steel vitally needed for maintenance of America's food industry is ready for immediate shipment at Ryerson! In the Ryerson stocks are more than 10,000 kinds, shapes and sizes, including many of the special steels used in the food industry.

Even today, with steel difficult to obtain because of the National Defense Program, Ryerson continues with its Certified Steel Plan. Naturally, many sizes and certain products are out of stock, however, for the most part you can depend on Ryerson for immediate shipment of a wide range of steel products.

The Ryerson Certified Steel Plan is of particular value in the case of alloys where chemical content, physical properties and other characteristics must be known with certainty in order to insure the best heat treatment response in the shortest possible time.

Whatever your steel requirements, phone, wire or write the nearest of the 10 conveniently located Ryerson plants. For best service during the period of heavy demand, "open" orders are advisable. Stock List sent promptly on request.

RYERSON PRODUCTS INCLUDE:

Structurals
Bars
Plates (15 kinds)
Sheets (25 kinds)
Strip Steel
Alloy & Tool Steels
Stainless
Shafting
Mech. Tubing
Boiler Tubes
Welding Rod
Babbitt, Solder
Reinforcing
Nails, Rivets, etc.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON *Certified* STEELS

RYERSON CERTIFIED STEELS

MEN · JOBS · COMPANIES

INDUSTRY

Borden Co. plans to quadruple the productive capacity of its Chester, S. C., plant, in a $100,000 expansion move.

British Columbia Packers, Ltd. reported damages of $120,000 when fire destroyed its cannery at Quathiaski Cove on Quadra Island, B. C. About 4,000 cases of canned salmon were destroyed with the main plant.

Carnation Co., Milwaukee, will construct a new plant for the manufacture of evaporated milk in Dadeville, Ala. The plant, to be completed by Jan. 1, will have a capacity of 250,000 lb. of milk daily.

Fort Worth (Tex.) Poultry and Egg Co. is building a $90,000 egg drying plant. J. B. Collier, Jr., is president of the company.

General Mills, Inc., Minneapolis, has issued a Nutrition Study Kit of six pamphlets prepared by the company's research and home service departments. The study kit gives factual information on the right kinds, amounts and preparation of foods.

Chr. Hansen's Laboratory, Inc. ("The 'Junket' Folks"), Little Falls, N. Y., has purchased "Dandelion" butter color from Wells and Richardson Co. Inc., Burlington, Vt., and will package and distribute the product with its line of 'Junket' foods.

Harriss Pie Co., Chicago, plans to build a $70,000 addition to its pie baking plant with the erection of a two-story brick building, 20X80 ft.

H. J. Heinz Co. has purchased Medina (N. Y.) Foundry Co. which has been closed since 1938. Heinz at present is using the large factory building and several smaller structures for storage purposes, but they may later be adapted to an expansion move of the company.

Icco Cheese Co., Inc. has been announced as the official name of Italian Cheese Co., Inc., Brooklyn, N. Y., which takes its trade-name for the corporation name as it moves into new and enlarged headquarters in the same city.

Jerpe Commission Corp., Omaha, Neb., has purchased a block adjoining its plant to remodel the property and erect a plant to dry eggs for Britain. The property was purchased for $87,000 and it was understood that about $150,000 would be spent for the plant, including new equipment.

Kemp Brothers Packing Co., Frankfort, Ind., has shipped a train of 53 carloads of Kemp's "Sun-Rayed" tomato juice to the New York metropolitan market. This is claimed to be the largest single shipment of pre-sold tomato juice on record.

Kraft Cheese Co. will move two of its Omaha, Neb. plants to a one-story brick building 132x132 ft., in the same city.

Kuhner Packing Co., Muncie, Ind., recently suffered loss of $50,000 in a fire started by lighting. The department housing the sausage plant, kitchens, stockroom and a $2,500 oven was destroyed.

National Biscuit Co. is gradually changing its brand identification from "NBC" to "Nabisco," and at present most of the line is labeled with "Nabisco" seals.

National Live Stock and Meat Board, Chicago, plans an extensive fall meat program with exhibits at live stock expositions, fairs and food shows to underscore the importance of meat in a defense diet.

Seaboard Packing Co., South Portland, Me., will erect a new sardine canning plant 40x100 ft., and a warehouse 80x40 ft.

Standard Packing Co., Kokomo, Ind., food processors, lost more than $50,000 in a fire which recently swept the plant.

Walker-Gordon Laboratory Co., Inc., Plainsboro, N. J., will celebrate its 50th anniversary on Oct. 7, with a program to be broadcast nationally on the "Farm and Home" hour. Featured speakers are Thomas Parran, surgeon-general of the United States, and Russell Wilder, chairman of the committee on food and nutrition, National Research Council.

JAMES G. GARDINER

Hon. James G. Gardiner, Minister of Agriculture of Canada, has joined the Council of Sponsors of the Inter-American Committee for the Dairy Industries. Mr. Gardiner joins administrators from 16 countries in the Western Hemisphere on the committee.

PAUL D. V. MANNING

Paul D. V. Manning, former director of research of Golden State Co. and vice-president of Western Condensing Co., San Francisco, has resigned to become director of research of International Agricultural Co., with offices in Chicago.

PERSONNEL

C. V. Anderson, formerly with Robin Hood Flour Mills Co., Ltd., Moose Jaw, Sask., has become general manager of the Cannon Valley Milling Co., Minneapolis, succeeding Miss Edith M. Schuler, who is retiring.

L. H. Behner has been named general manager of the Lake Erie Milling Co., near Ashtabula, Ohio, succeeding C. H. Gegelein, resigned.

Vernon L. Clark, chairman of the board of the Inland Milling Co., Des Moines, has been appointed president, succeeding J. Dolliver Kent, resigned.

A. C. Cowan, Vancouver, B. C., until recently one of the leaders of the baking industry, has arrived at Oban, Argyleshire, Scotland, to assume a position in the ministry of food connected with the war effort. Mr. Cowan relinquished presidency of the Master Bakers Association and active managership of Cowan-Dodson Bakeries, Ltd., last July. He does not expect to return to Vancouver until after the war.

Nathan Cummings, president of C. D. Kenny Co., Baltimore, since September, 1939, has become sole stockholder of the company, purchasing stock from the Kenny estate. Capital and surplus of the company are estimated in excess of $100,000,000.

Waldemar Dasler, formerly with B. S.

STOP THAT WEEVIL!

IN plants where food is processed and stored, weevils and other destructive pests can be controlled by thorough fumigation with an effective fumigant such as HCN gas. Careful planning, good housekeeping and application of the fumigant by trained, experienced men are essential for a good kill.

Many food processors have found that control problems are ably handled by established Pest Control Operators. These operators are equipped to give prompt and specialized service on practically any type of mill fumigation.

If you have your own pest control crew, we have a useful book about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. No obligation, of course.

DU PONT

E. I. DU PONT DE NEMOURS & CO.
INCORPORATED
THE R. & H. CHEMICALS DEPARTMENT
WILMINGTON • DELAWARE

CYANEGG
AN ECONOMICAL SOURCE
OF HCN FUMIGATING GAS

Pearsall Butter Co., Elgin, Ill., has accepted a position as research chemist with Nutrition Research Laboratories, Chicago.

Ray F. Johnson has been elected manager of the Little Rock, Ark., branch of Armour & Co. He was formerly branch manager at Lubbock, Tex.

George H. Kramer, former district manager for Standard Brands, Inc., in Japan, has become assistant manager of the special products department of the New York office.

James E. Larrow, Detroit, has been reelected president of the Farmers and Manufacturers Beet Sugar Association, representing all growers and processors in the Great Lakes area.

Asher J. Margolis, Mt. Vernon, N. Y., has been placed in charge of chemical and development work at Nutrine Candy Co., Chicago.

Arthur C. Mohr has been named general manager of the corn sirup division of Anheuser-Busch Co., St. Louis.

Robert H. Montgomery, formerly vice-president and manager of the Alton, Ill., mill of the Stanard-Tilton Milling Co., has joined the Kansas Flour Mills Co. as a sales executive.

Russell Morgan, for the past nine years manager of the Panama district of Standard Brands, Inc., has been named assistant manager of the foreign department in the home office, New York.

Martin B. Spencer is new manager at Nashville of the Taystee Bread Co., a subsidiary of Purity Bakers, Inc. He succeeds Ray Mauren, who has been transferred to St. Louis.

C. G. Vaupel, formerly chief chemist of Universal Mills, Fort Worth, Tex., has joined the general sales division of Merck & Co., Inc., Rahway, N. J.

JERVIS J. BABB

J. J. Babb, formerly with the management engineering firm of Booz, Fry, Allen and Hamilton, has been appointed general manager of Booth Fisheries Corp., Chicago. R. E. Matthews is his assistant.

DON C. BRYAN

Dr. Pepper Co. has elected him a vice-president with headquarters in Dallas. Mr. Bryan has been a Dr. Pepper bottler since 1931, operating plants in Macon, Albany and Fitzgerald, Ga., and Montgomery, Ala.

O. B. Williams of the research laboratories of National Canners Association, Washington, D. C., has resigned to become professor of bacteriology, University of Texas, Austin.

Dwight K. Yerxa, formerly general manager of the Buffalo, N. Y., plant and vice-president and director of Pillsbury Flour Mills Co., has resigned.

DEATHS

Harry Abraham, 46, vice-president in charge of beef operations, Abraham Bros. Packing Co., Aug. 31, in Memphis, Tenn.

Fred J. Brand, 70, president and manager of Marathon City Brewing Co., Marathon, Wis., Aug. 26.

William Danhauser, 53, stock manager of Jewel Tea Co. in Buffalo, Aug. 26.

William C. Deininger, 80, director and retired chairman of the board of General Baking Co., Sept. 6, in Rochester, N. Y.

William Klusmeyer, 51, vice-president and assistant to the president of Standard Brands, Inc., Sept. 18, in Yonkers, N. Y. He had been associated with Standard Brands and with the Fleischmann Co. for over 30 years.

Roy D. Morrison, 48, vice-president of P. Burns & Co., Ltd., Calgary, Alberta, B. C., recently. He came to Calgary from Kitchener in April after P. Burns & Co. acquired Dumarts, Ltd., of which he was sole owner.

Andrew Muldoon, 49, head of Bonni-

Doon Ice Cream Co., Mishawaka, Ind., and formerly head of Muldoon Dairy Corp. and Muldoon Ice Cream Co. in Fort Mayne, Aug. 30.

John Albert Sheetz, 68, founder of the candy and restaurant chain bearing his name, Sept. 15, in Los Angeles.

Julia Weber, 82, former president of Weber Waukesha Brewing Co., Aug. 26, in Waukesha, Wis.

Frank Walker Wheeler, 50, vice-president and director of A. & P., Aug. 31 in Boston. He was a director of seven divisions of the company.

ASSOCIATED INDUSTRIES

Aluminum Co. of America announces that a contract has been made with Defense Plant Corp., acting for the United States for the construction and operation of an alumina plant in Arkansas with annual capacity of 400,000,000 lb., and for the construction and operation of an almuminum smelting plant. at Massena, N. Y., with an annual capacity of 150,000,000 lb., another in the Portland, Ore., district with an annual capacity of 90,000,000 lb., and a third in Arkansas with a annual capacity of 100,000,000 lb.

Continental Can Co. is making a 75,000-sq. ft., one-story brick-and-steel addition to its Clearing Industrial District, Chicago plant.

Frick Co., Waynesboro, Pa., reports the death of Dr. D. B. Snively, director of the company for the past 40 years, on Aug. 28.

Johns-Manville Corp. has completed a contract with the War Department to construct and operate a $27,000 shell loading plant near Parsons, Kan. The plant, to be known as the Kansas Ordnance Plant, will cover 25 sq. miles, comprise about 400 buildings, 75 miles of track, and 100 miles of road, and employ about 8,000 persons.

Kold-Hold Mfg. Co., Lansing, Mich., has purchased the Truck Plate Division of the Savage Arms Corp., Utica, N. Y., in a transaction which includes all machinery, patents and good will.

Reynolds Metals Co., Research Corp., has added 125,000 sq. ft. of manufacturing space to its Louisville, Ky. plants, and will spend about $25,000,000 in modernization of the building and installation of machinery for the manufacture of metal-capped paper containers for use in shipping gun powder.

Stokes & Smith Co., Philadelphia, report the death of Daniel E. Maxfield, sales engineer, on Sept. 1. Mr. Maxfield had been associated with the company's packaging and filling division since 1919.

PILING UP SOME "HEAVY SUGAR"

TOWMOTOR

BRINGS A "SWEET" SAVING IN HANDLING COSTS

● One of the biggest cost items you now have in your plant is materials handling. Hard to believe? Well, just count the number of men, and time the hundreds of separate operations required in unloading cars, placing materials in storage, keeping machines supplied, warehousing finished products, preparing shipments. Then compare your present methods with Towmotor's speed, efficiency and low-cost in moving materials *into, through* and *out* of your plant.

In one *continuous* operation Towmotor picks up a 1,000 to 10,000 lb. load in box car or truck, hustles it to the warehouse in *seconds,* stacks up to 25 feet high. On the average, Towmotor loads or unloads a whole car in less than an hour . . . speeding up service, minimizing the risk in perishable goods. Stacking to near-ceiling heights increases warehouse capacity . . . often as much as 50%.

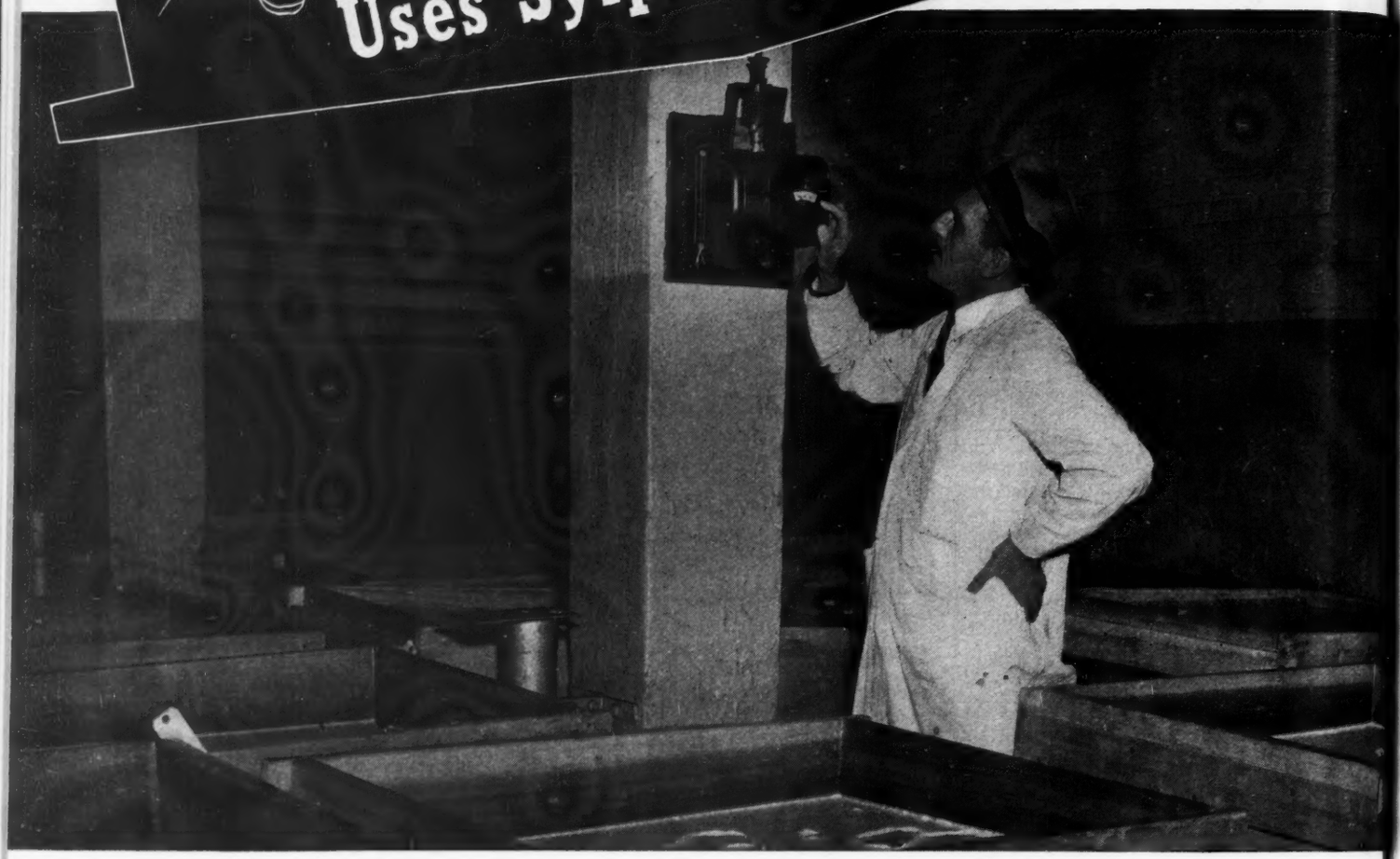
Towmotor, too, is a definite production aid . . . delivers multi-ton loads that keep machines in uninterrupted service. And when finished goods are ready Towmotor eliminates waste motions in storing and shipping. Ten men couldn't begin to do the job that Towmotor handles with ease . . . yet Towmotor operates for less than one man's wages.

Want to learn how Towmotor can "sweeten up" your operating budget . . . for years to come? Let Towmotor engineers make a survey, show you how it's done.

TOWMOTOR COMPANY 1268 E. 152nd Street, Cleveland, Ohio

Let TOWMOTOR CLEVELAND take the load off your hands

UNITED DRESSED BEEF Uses Sylphon Controls . . .



FOR DEPENDABLE REGULATION OF OLEO SEEDING ROOM TEMPERATURE

Sylphon Temperature Control helps solve a ticklish problem in slow-cooling of rendered fat. Oleo seeding room temperatures must be constant between 88° and 90° F to assure separation of oleo stearine for lard substitutes, oleo oil for high-quality margarines, and other edible solid fats.

The continuous *modulating* action of Sylphon Controls automatically *maintains* the desired seeding room temperature at a constant, uniform level—a result which could not be accomplished by the common on-off type of control.

Sylphon Controls are adaptable to many applications in the Food Industry—for controlling temperatures of cooking, canning, drying, curing, dehairing, pasteurizing, smoking, sterilizing, freezing, refrigerating and many other food processing and storage requirements.

Always reliable, economical, trouble-free in operation. Get the complete story about modern Sylphon Control from a Sylphon Representative, or write for Bulletin TG-20.

FULTON Sylphon FOR TEMPERATURE CONTROL

THE FULTON SYLPHON CO.

KNOXVILLE, TENNESSEE

Representatives in All Principal Cities in U. S. A. and in Montreal, Canada and London, England

NEW PACKAGES & PRODUCTS

Two New Energy Foods

More and more manufacturers are introducing fortified foods to take advantage of the growing demand for vitaminized products. Newcomers to the field of enriched foods are "Ben-Hur" gelatin with vitamin B_1 added, and "Lane's Jonni-Boy Vit-A-Hon," a clover honey base containing vitamins A, B_1, C, D and G.

The new Ben-Hur calf gelatin, distributed by Ben-Hur Products, Inc., Los Angeles, Calif., contains over 20,000 International Units of vitamin B_1 per pound. Odorless and tastless, the product can be added to fruit drinks or used in making gelatin salads. The company also produces "Ben-Hur Jell-A-Teen" with B_1 added, a gelatin dessert in eight flavors with a fresh fruit taste.

Michigan Honey Association Inc., Detroit, Mich., is marketing Lane's Jonni-Boy Vit-A-Hon, a processed food containing clover honey, roasted and ground herbaceous seeds and seed oils, partly defatted wheat germ and other vitamin sources. It can be served with toast, waffles, as a sandwich spread or dessert.

Blue-Ribbon "Dog" Label

A first prize in the National Food Distributors' package competition went to Oscar Mayer & Co., Chicago, Ill., for the label on its canned wieners. Judges representing consumers, retailers, distributors, art and industry selected the wiener package for top award in the metal-container classification of the competition.

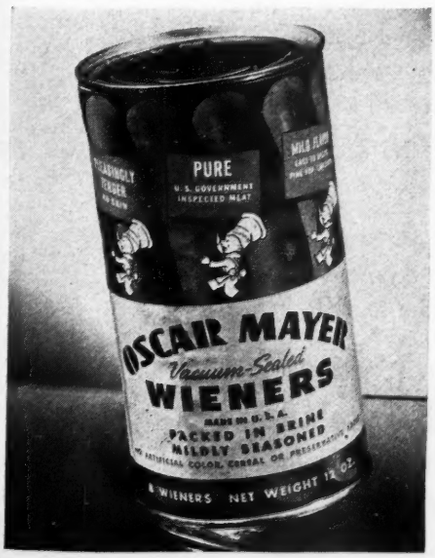
The package was selected because of the completeness of the information on the label, which effectively pictures the contents of the can. According to the judges, "the package is rapidly gaining national distribution for the product without benefit of substantial advertising and merchandising support." The label carries five suggestions on how to serve, and emphasizes 14 important product features.

Rip Cord for Cloth Bags

"Rip-Cord Closure," a new method of closing cloth and burlap bags, has been introduced by Bag Closure Corp., Nazareth, Pa. The closure, which may be applied to cloth and jute bags before or after filling, may be opened quickly and easily without injury to the bag, permitting re-use. You merely grasp the extension of the cord in one hand and pull across the closure.

A special high-speed assembly-line method of applying this closure has been developed. It can feed, sew, count and automatically stack over 1,000 bags per hour. Paper strips, serving as identification and aiding in opening, can be attached in the same operation as the closure.

Rip-Cord Closure is said to give greater ease in handling and increase storage capacity up to 20 percent over wire-tied bags. The closure can be applied to bags containing such foods as flour, raw sugar, salt, nuts and dried beans.



Food Wanted: 6,000,000 Tons
WHY FRANCE GOES HUNGRY
By SIDNEY JAFFE
War Creates Market For American Wines
MATERIALS
The Wartime Picture Of Tin Supplies
How the ARMY and NAVY Buy Food
Jam Jar Standardized For Army and Public
Study of Dried Foods Expanded for Emergency
Nothing Can Take the Place of YOUR OWN TRUCKS In a War Emergency
Foods That Aided Blitzkrieg
Lend-Lease and Defense Increase Food Demand
By G. L. MONTGOMERY
What Would a "WAR LOAD" Mean to the Food Manufacturer?
Head G-Man on Anti-Sabotage
Remember "Meatless Tuesdays"?
What a War Would Do To Food Consumption in the United States
Britain Fortifies Its Food

NATIONAL DEFENSE!

In World War One, the vital importance of food in National Defense was not recognized until the situation approached a crisis. This time, as far back as June, 1939, FOOD INDUSTRIES published a symposium on Food and National Defense in an effort to avoid a repetition of the errors of 1917-18, by emphasizing the problems a war economy would bring to the food manufacturing industries. Practically every issue since then has carried material along these lines—outlining the lessons to be learned from England, France and Germany in the way they have met problems of food supply under actual war conditions. Special emphasis of late has been placed on methods of dehydrating foods to produce the tremendous quantities required for feeding millions of people in Britain and probably Russia and China, along with our own armed forces and civil populations.

ABC **FOOD INDUSTRIES** ABP

For Those Who Control Quality Through Management and Production

330 West 42nd Street, New York, N. Y.

FOOD EQUIPMENT NEWS

Rotary Pumps with Gearhead Motor Drive

BLACKMER PUMP CO., Grand Rapids, Mich., has brought out a new design of rotary pumping unit with gearhead motor drive. These pumps will be furnished as standard units in capacities from 20 to 450 gal. per minute. The basic design is the same as that of other Blackmer rotary pumps—making use of the bucket or swinging vane impeller. Manufacturers of the new unit claim that it is considerably smaller in size than other rotary pumps of comparable capacity and pressure. With the gearhead motor drive, there are available a wide range of speeds to suit various industrial applications.

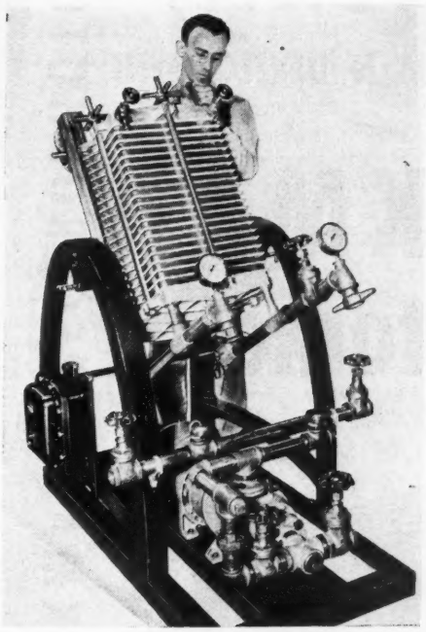
Horizontal-Vertical Filters

AMERICAN SEITZ FILTER CORP., Paterson, N. J., has brought out the "Flexmaster" filter, which is said to be of an entirely new type. This filter combines sheet and alluvial filtration, combines any kinds of media, and is said to be the only filter that turns from horizontal to vertical operating position. The advantage claimed for this arrangement is the prevention of collapse of the filtering layers, however short the run. This follows from the fact that these layers top each other during operations, so that they are held intact both by gravity and the pressure of the unfiltered liquids.

Another exclusive feature claimed for the filter is the fact that it can be drained dry by a quick shot of compressed air, thus completely recovering the residue. It is said that this can be accomplished even though every square inch of filtering surface is used throughout the entire run. Another advantage claimed is the possibility of direct dual filtration when required. In this case, the unfiltered liquid flows directly through two joined filtering media, such as diatomaceous earth deposited on a filter sheet. In this way rough and polish filtration are combined, and the choice of filter media combinations is unlimited.

In construction, the filter is held on an axis in a sturdy stand, can be swung easily from horizontal to vertical position, and locked either way.

In operation, the loading of the filter is started in horizontal position. Plates are slid apart and the filter paper, sheet or cloth is slipped in and aligned over two sleeves that connect the discharge channels of the plate. Then the entire unit is securely fastened. Next, the filter is swung into the vertical position, and the feed and discharge lines are tightly connected with special unions. Setting of the filter media on the plate is then begun by using a pump and mixing tank and recirculating the filter aid, until the precoat is deposited on the sheet or screen. Thereafter, filtration is carried out in the usual manner by a proper manipulation of the valves.



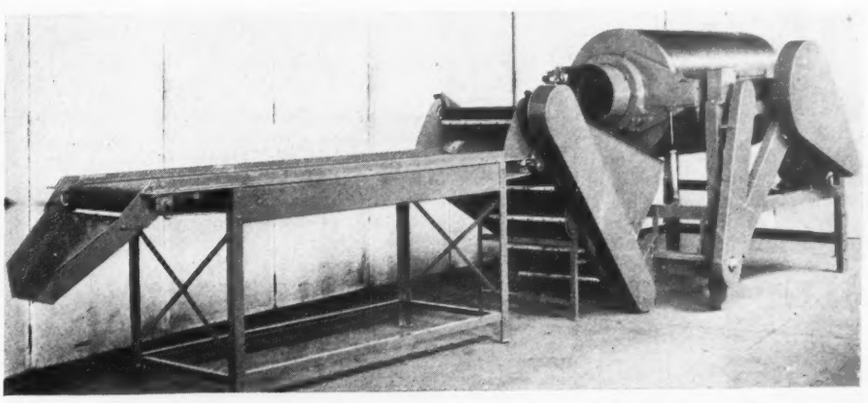
Horizontal-vertical filter of plate type which uses dual media.

To clean the Flexmaster, it is tilted back to horizontal position. The plates are then parted and the spent layers are stripped into the drip pan which is supplied with the filter. This obviates the necessity of lifting out each plate separately, cleaning it and reassembling the filter.

Automatic Bean Snipper

RATED by the manufacturer with a capacity up to 1,800 lb. per hr. of snipped beans, the FMC automatic bean snipper, recently introduced by Food Machinery Corp., Hoopeston, Ill., enables one operator to feed beans to a battery of several machines. It is also said to reduce the labor of inspectors and trimmers, so that only four workers are required to handle the entire output of the machine under average conditions.

Several new features are said to make this performance possible. The horizontal drum which revolves at from 36 to 40 r.p.m., takes a charge of four to five bushels of beans at one time. After loading, it revolves for from 4½ to 9 minutes, depending upon the type or variety of beans being handled. It then elevates and automatically discharges the correctly snipped beans into a storage hopper, from which the beans are raised by a conveyor and distributed evenly over the picking table. The surface of the revolving drum is perforated with thousands of countersunk openings which permit the bean end to be severed by two knives fitted to the outside of the drum. The perforations are arranged spirally, in order to prevent grooves being worn in the knives. Automatic gage plates inside the drum push back the beans as they approach the knives. In this way, it is said that all beans are snipped uniformly regardless of taper, unnecessarily deep cutting is avoided, and the beans are prevented from sticking in the perforations and clogging the



Automatic bean snipper that is said to provide increased speed and efficiency at lower cost.

Announcing

AN IMPORTANT NEW BECKMAN DEVELOPMENT

THE BECKMAN Spectrophotometer

Features Many Unique and Far-Reaching Advancements

This precision instrument—the product of several years intensive development by the Beckman research staff—incorporates many important advancements in the design of spectrophotometric equipment, such as:

...*the finest type* of crystal quartz monochromator which covers the full spectral range of interest in spectrophotometry—200 millimicrons in the ultraviolet to 2000 millimicrons in the infrared.

...*precision* optical parts completely protected from dust and fumes.

...*extra long* (100 cm) easily-read Wavelength Scale.

. .*direct readings* in both % *Transmission* and *Density*—simultaneously.

...*continuously adjustable* Slit Mechanism to fit every possible requirement.

...*full scale readings* with nominal band widths 2 millimicrons or less over most of spectral range.

...*stray light effects* less than 1/10% over most of the spectral range.

The Beckman Spectrophotometer is entirely *self-contained*, with a unique electronic circuit for rapid measurement of % Transmission and Density. The remarkable versatility of the instrument enables it to meet the widely varying requirements of research and control work with no sacrifice in accuracy or convenience. Regardless of type of Spectrophotometric measurements you are interested in, be sure to investigate the outstanding advantages provided by this new Beckman development!

NATIONAL TECHNICAL LABORATORIES

SOUTH PASADENA, CALIFORNIA

IMPORTANT FEATURES OF THE BECKMAN SPECTROPHOTOMETER

MONOCHROMATOR ★ Auto collimating type with selected crystal quartz prism provides high dispersion in the ultraviolet. Wavelength scale graduated from 200 millimicrons in ultraviolet to 2000 millimicrons in infrared, easily readable to 0.1 millimicron in ultraviolet to 1.0 millimicron in the red, with scale accuracy better than 1.0 millimicron. Optical parts rigidly mounted in a massive heat-treated iron block, within a dust-proof cast-aluminum case. Slits are protected by quartz windows and are continuously adjustable from .01 to 2.0 mm. by a unique mechanism that permits very precise adjustment, particularly when slit width is small. Slits cannot be damaged by closing too far.

LIGHT SOURCES ★ Interchangeable light sources permit ready adaptability to all types of spectrophotometric work. Efficient design provides full-scale accuracy even with low light intensities. Lamp housing is well ventilated and heat-shielded to minimize temperature changes in absorption cells and phototubes.

SAMPLE HOLDER ★ Absorption cells are held in light-tight slide holding 4 cells with light path of 1 cm. or less. Interchangeable additional holders are available for cells up to 10 cm. in length. Top of cell compartment is removable for titration and other special techniques.

PHOTOTUBES ★ Compartment holds two phototubes, a sliding knob bringing either tube into position and simultaneously switching electrical connections. Phototube dark current can be checked at any time without removing cells (or changing setting of electronic meter). Three types of phototubes are available: one having maximum sensitivity in the red, another having maximum sensitivity in the blue, and a third having maximum sensitivity in the ultraviolet.

MANY OTHER IMPORTANT FEATURES ARE INCORPORATED IN THE BECKMAN SPECTROPHOTOMETER. SEE YOUR NEAREST DEALER OR WRITE FOR DESCRIPTIVE LITERATURE.

operation. Further provision for trouble free operation is made by a safety mechanism, which throws the knives out automatically so that no damage can occur if nails or other foreign matter enter the drum.

Standard size drum perforations are 15/64 in. for No. 1, 2 and 3 pregraded beans, or field run beans of the small round type; 18/64 in. for field run beans of most varieties and for Nos. 4, 5 and 6 pregraded bean; 20/64 of an inch for handling extremely large or flat beans.

Portable Tube Cleaner

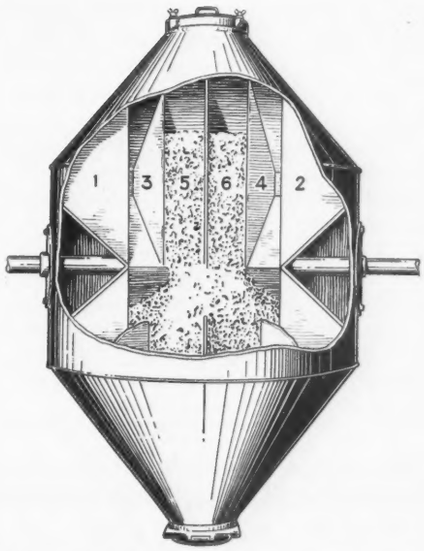
National Electric Mfg. Co., 60 E. 42nd St., New York, has developed a portable, self-contained tube cleaner and scrubber. The unit consists of a 20, 40, or 60 gal. solution tank mounted on a carriage with ball bearing, rubber-tired casters. On top of the tank is mounted a double end shaft motor, which drives an automatic overload and underload compressor at one end and at the other end drives a 15-ft. rubber covered flexible tube cleaning shaft. This latter has a special adaptor which takes the solution feed scrubber handle which can be used for scrubbing pasteurizer tanks, vacuum pans, or food kettles. The adaptor will also take a solution feed tube cleaner shaft which can be used for cleaning preheater, evaporator and other non-detachable tubes.

With this equipment, scrubbing handles are furnished from 12 to 36 in., long and tube cleaner shafts from 3 to 10 ft. long, suitable for tubes from $\frac{7}{8}$ in. to 6 in. inside diameter. Several types of brushes are interchangeable on either the scrubber handle or the tube cleaning shaft, permitting a wide range of cleaning application.

Accurate Batch Mixer

Advent of such food processing operations as enrichment of flour with vitamins and minerals has made extremely important the production of accurate and uniform mixes, particularly where one or more of the ingredients are required in very small quantities with relation to the main ingredient. For example, in preparing the master mixes of flour, vitamins and minerals, to be fed into the main flour stream of a mill, it is necessary in order that the correct amount of enriching ingredients be placed in every pound of the finished flour that this master mix be absolutely uniform.

A mixing device which is said to make this possible is the MacLellan mixer, manufactured by Anglo-American Mill Corp., Owensboro, Ky. This mixer, obtainable in standard sizes from 5 qt. to 160 cu. ft. capacity, operates on a principle of continual cycles of division and remixing of the contents. Referring to the accompanying illustration, it will be noticed that the inside of the mixer is equipped with a number of separator plates. Charged in an upright position, as the mixer revolves the material is divided by the separator into six lots. When the drum reaches a 45 deg. angle, the material is discharged from the pockets marked *1* and *2* and mixed into the other end of the drum. At 60 deg., the pockets marked 3 and *4* discharge, and



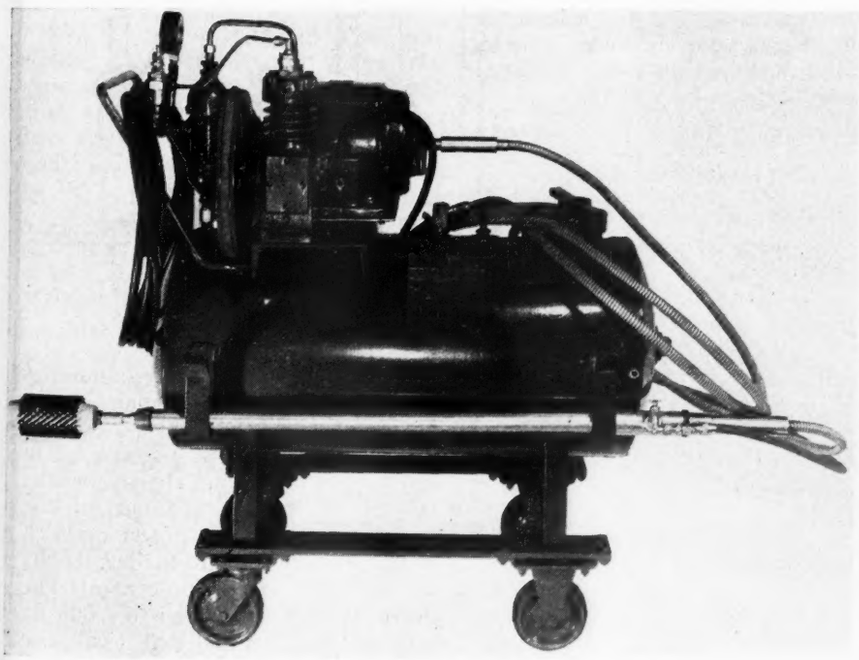
Cutaway view of MacLellan mixer, showing separator plates which quickly produce a uniform mix.

at 80 deg. the pockets marked 5 and 6 discharge. As a result, there are twelve complete separations and mixes to every revolution or 60 mixes in five revolutions.

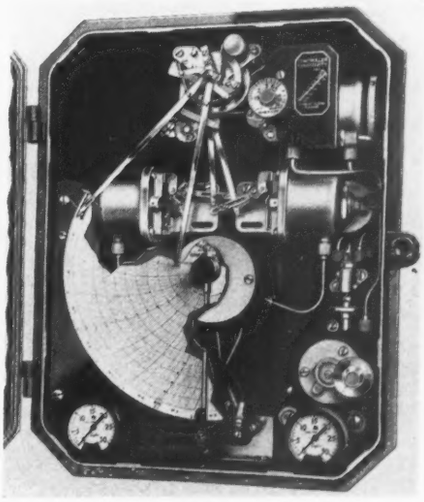
In addition to the thorough mixing claimed for this equipment, high speed production, simplicity of design and low power demand are also claimed as advantages.

Direct-Set Ratio Controller

Taylor Instrument Cos., Rochester, N. Y., has brought out an adaptable, easily convertible instrument for applications where a temperature, pressure, rate of flow, or liquid level must be controlled in a desired ratio or differential to another related variable. In this direct setting ratio controller, the ratio is changed by a simple screwdriver adjustment directly on the calibrated dial throughout a range up to



Portable motor-driven tube cleaning and scrubbing machine.



Direct set ratio controller.

3 to 1, direct or inverse. In making adjustments, it is unnecessary to disturb the processing operation or to remove the chart plate from the instrument.

This controller has two measuring systems: one an adjusting system which indicates or records only; and the other a controlling system which may either indicate or record. The adjusting system resets the control point of the controlling system through a linkage arrangement according to a predetermined ratio. Both indicating and recording models of this controller are available.

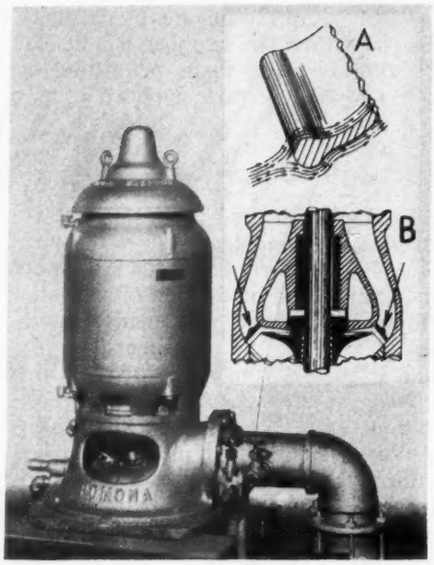
Heavy Duty Hand Lift Truck

LEWIS-SHEPPARD SALES CORP., 245 Walnut St., Watertown, Mass., are making an extra large hydraulic hand lift truck for heavy loads. This truck can be furnished for loads up to 35,000 lb. in which case the platform length is 10 ft. and the width is 5 ft. The lowered height of the platform is 15 in.

The truck has four rear wheels, 15 in. in diameter by 10 in. face, mounted on heavy duty ball bearings. There are also four front wheels, 20 in. in diameter by 5 in. face, mounted in an auto-type steering arrangement on heavy duty roller bearings. The truck is also equipped with a towing hook in the front.

Plastic Instrument Dial Faces

WHITE instrument dials, said not to be discolored by high temperatures, light, fumes or moisture, are being made by the Westinghouse Meter Div., Westinghouse Electric & Mfg. Co., Newark, N. J. These dials are faced with a liquid plastic material that is sprayed onto the metal in much the way lacquer or paint would be sprayed. The foundation of the dial is a metal sheet.



New shape of guide vane end for vertical turbine pumps. Guide vane end shown at *A*, cross section of whole assembly shown at *B*.

Improved Vertical Pumps

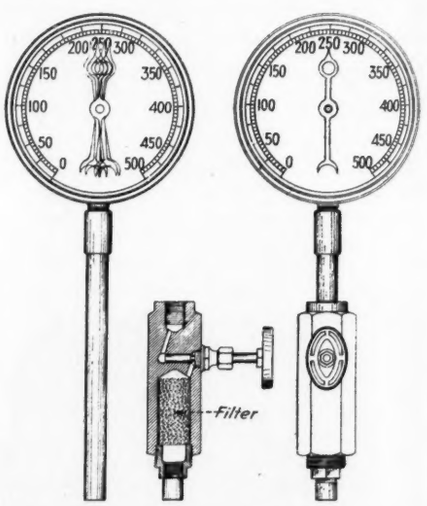
POMONA PUMP CO., St. Louis, Mo. has recently brought out a patented design guide vane which is said to reduce hydraulic losses in the pump and increase efficiency as much as 10 percent. The improvement, involving a fundamental design change in the guide vanes, gives the advanced vane end a bulbous shape. As a result, there said to be a greater uniformity of flow of the liquid over the vane end, reductions in friction and increase in efficiency of fluid lift. Also, because of the recessive curve at the rear of the bulb shaped vane end, eddy currents are not developed. Another advantage claimed is that the broader guide vanes give increased strength because of their extra thickness.

This improvement is now available in all sizes of this company's vertical turbine pumps. For existing installations, the new development can be made available simply by changing bowl assemblies.

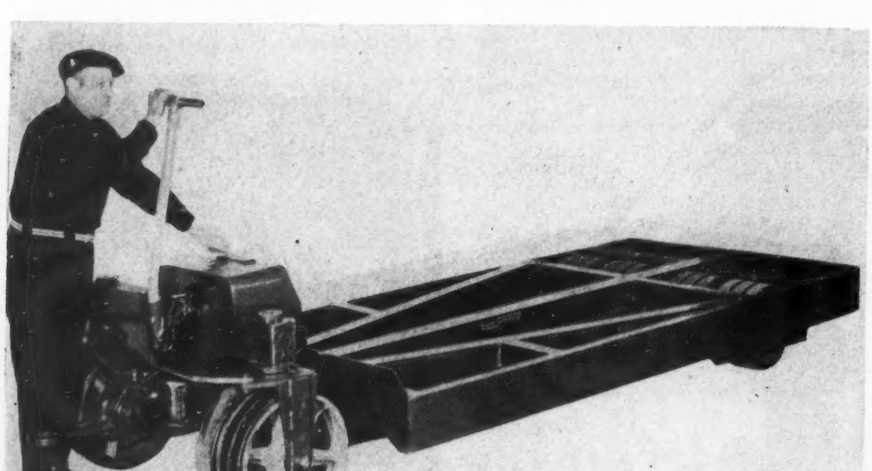
Gage Protector

FOR DAMPENING the pulsations that give the "jitters" to gage pointers, J. A. Campbell Co., 645 E. Wardlow Road, Long Beach, Calif., has developed a device known as the "Micro-Bean." This can be installed on the pressure line to the diaphragm of a pump governor for protection of the pressure gage mechanism and tube, and also the spring, diaphragm and stem packing. It is also effective as protection to any control valve, such as a back pressure or reducing regulator, and for use with sensitive control instruments subjected to pulsating flow. The valve will handle fuel oil, gas, water, or other liquids with simple adjustment for varying viscosities.

The device consists of a solid brass body in which a filter is inserted for protection from foreign matter. The valve has an extremely slight taper so that sensitive control of the shut-off is effected. This slight taper minimizes the tendency to pinch off under changing pressure conditions to approximately 2 percent of what may be expected in other types of valves. The micromatic control of the opening enables the operator to obtain the closest approach to full shut-off down to the last 0.0003 in., regardless of the line content. The device is built for use up to 3,000 lb. pressure, and it is said that it will give any degree of stabilization desired by mere adjustment of the valve.



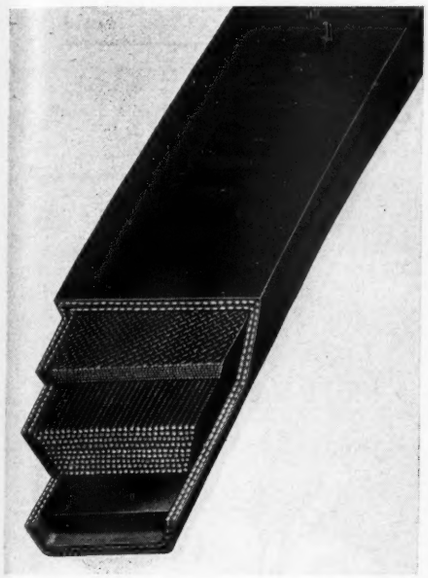
Valve device to eliminate "jitters" in gages and recording instruments.



Heavy-duty hand-operated hydraulic lift truck.

V-Belt Construction

ALLIS-CHALMERS MFG. Co., Milwaukee, Wis., has brought out a new construction for its Texrope V-belts. These are now all of the "Super 7" laminated design, stated to give more strength and flexibility, greater service and longer life.



New construction for V-belts.

The cords in the new construction are smaller, permitting the use of more cords per belt, with a resulting greater strength and less stress. Each cord is individually imbedded in rubber to reduce internal belt degeneration.

These belts are made in matched sets to assure uniform, smooth-running, efficient drive. In construction they consist of a live rubber bottom cushion for absorbing impact, a central cord portion for transmitting power at the effective pitch diameter, and a bias cut fabric at the top to prevent dishing and assure transverse stability. These three elements are covered with a two-ply rubber impregnated fabric cover.

Closing Device for Filters

D. R. SPERRY & Co., Batavia, Ill., has brought out an electrically-operated hydraulic closing device for filter presses. Known as the Sperry Type EHC, this device is said to incorporate novel mechanical features providing easier, safer, more economical and more precise control of the press. The device can be applied to existing filter press installations without extensive alteration. To install it on Sperry filter presses, all that is necessary is the substitution of the cross-head.

Among the special features claimed for this device are elimination of the usual hydraulic valves, extreme simplicity in operation, elimination of nearly all operator-effort in closing the press, and control of travel of the hydraulic piston to extreme position in either direction.

Factory Communication System

A LOW-PRICE, super-power electric paging and inter-communicating system for factories and other institutions has been brought out by the National Intercommunicating Systems, 2434 Montrose Ave., Chicago. Known as Model 400, this system will allow conversation between 1 to 10 people at any one time or individually. Calls can originate from either end. A two-way voice link is available for any distance up to 15,840 ft.

Using less current than a 40-watt bulb, this device, known as the "Convers-O-Call" operates on ordinary 110 volt a.c. or d.c. from a single electrical outlet. The device can also be used with a public address system when it is desired for one individual to speak to a number of workers or others.

Learn How to SAVE

30% to 70% on Ice Costs . . .

with VILTER PAKICE!

Better product icing at lower cost has paid for the purchase of VILTER PAKICE Equipment in many modern food plants! How much would YOU save if you could MAKE YOUR OWN ICE at costs as low as $1.25 per ton?★ This low cost is a common experience with many Food Plants.

For packing perishables, Vilter PAKICE offers much better protection. It packs closely around the product, forming a soft, secure, "blanket of cold" that prevents the passage of warm air. PAKICE, with its tiny, uniform crystals, LOOKS like snow, and handles as easily as snow. Saves you handling, crushing labor and expense. Provides plenty of ice WHEN and AS you want it — at the mere turn of a switch. And the small, compact PAKICE Units require surprisingly little floor space.

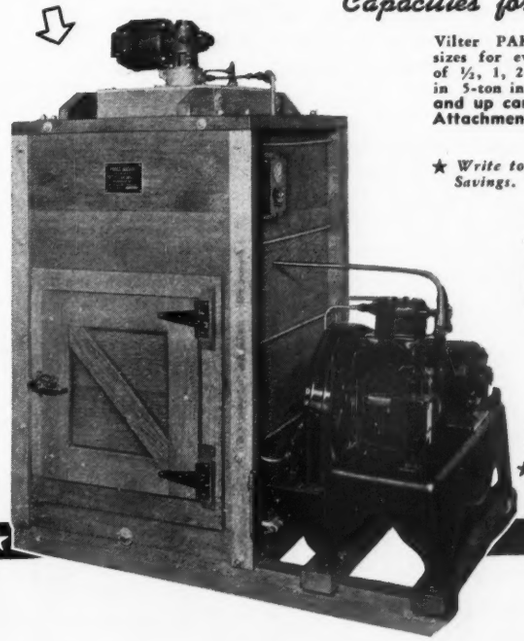
VILTER ½-ton PAKICER . . .

Completely self-contained. Requires only water and power connection.

Capacities for EVERY NEED!

Vilter PAKICE Equipment is made in sizes for every plant, in daily capacities of ½, 1, 2½, 5 tons, and up to 30 tons in 5-ton increments. Units of 15 tons and up can be equipped with Briquette Attachment for car icing.

★ Write today for your story on PAKICE Savings.



Superior Since 1867 VILTER Refrigeration ... Air Conditioning

The Vilter Mfg. Company
2115 South First Street
Milwaukee, Wisconsin
Offices in Principal Cities

★ Depending upon your power and water costs and water temperature.

HERE'S THE *Inside Story* OF A WALSEAL FITTING...

"It's a Silver-brazed joint — not a soldered joint."
"When the silver fillet appears the joint is made. Finished joint is strongest part of the line!"
"It's easy to make. Brazing alloy is inserted at the Walworth factory."

THE MODERN FITTING designed to IMPROVE BRASS AND COPPER PIPING

A Walseal Fitting is a threadless bronze fitting with a ring of brazing alloy — Sil-Fos — incorporated in each port opening. It is used to join brass or copper pipe, or Type B copper tubing, and the resulting joint is known as a Silbraz Joint.

A finished Silbraz Joint — brass or copper — is stronger than either the pipe or fitting with which the joint is made. A Silbraz Joint cannot creep or pull apart under any temperature to which the pipe or tube can be safely subjected. Moreover, a Silbraz Joint is leakproof, corrosion resistant, vibration proof, and easy to install. The correct amount of brazing alloy is inserted in each Walseal Fitting at the Walworth factory. To install, simply cut the pipe, clean and flux the pipe-end and fitting-bore, assemble, and braze with an oxyacetylene flame.

Remember, a Silbraz Joint is a silver brazed joint,—*not* a *soldered joint*. Bronze Valves and Flanges having Walseal features are also manufactured by the Walworth Company. For further information see your nearest Walworth distributor or write for illustrated circular #46.

WALWORTH

VALVES FITTINGS and TOOLS
Backed by 99 Years' Service

WALWORTH COMPANY
60 EAST 42nd STREET, NEW YORK

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

JUST OFF THE PRESS

BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Batch Mixer—The Maclellan Batch Mixer, particularly designed for the quick and accurate mixing and blending of food products, in a range of sizes from 5 qt. to 150 cu.ft., is described in an illustrated bulletin of Anglo-American Mill Corp., Owensboro, Ky.

Coffee Equipment—Three new bulletins discussing equipment useful in the coffee roasting plant have been issued as follows: Bulletin 23R7, describing the Thermalo roaster for coffee; Bulletin 24A3, describing the Stirflex cooler for roasted coffee; and Bulletin A1, describing the Burns stoner for removing foreign material from roasted coffee before grinding; all published by Jabez Burns & Sons, Inc., 11th Ave. and 43rd St., New York.

Factory Trucks—A low-lift, hand-operated, hydraulic factory lift truck for use in handling systems employing skid platforms, is described with specifications and photographs in Bulletin No. 123, published by Lyon Iron Works, Greene, N. Y.

Filling Equipment—Automatic lines for the cleaning, filling, capping and labeling of bottles are discussed and illustrated by a layout drawing in a recent folder of Pneumatic Scale Corp., Ltd., 72 Newport Ave., North Quincy, Mass.

Homogenizer—The "MultiFlo" homogenizer, featuring the new "Single Service" homogenizing valve, which is of inexpensive construction and is changed after every use, is described and illustrated in Bulletin N-12 published by the Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago.

Materials Handling Equipment – Conveyors especially designed for use in fruit and vegetable canning and packaging plants are illustrated and described in Bulletin 40, a 6-page publication of Standard Conveyor Co., North St. Paul, Minn.

Processing Equipment—A line of agitators, mixers, digesters, kettles, and grinding equipment is described, with illustrations and specification tables, in 28-page catalog No. 101 of H. K. Porter Co., Inc., 4941 Harrison St., Pittsburgh, Pa.

Refrigeration Equipment—Reciprocating refrigeration compressors from 2 to 60 hp. and turbo-vacuum compressors from 50 to 200 tons capacity, for industrial refrigeration work, are described and illustrated in Bulletins DS-361 and S-399 respectively, by the Trane Co., LaCrosse, Wis.

Refrigeration Equipment—Shell-type condensers and coolers for various types of refrigeration and air conditioning service are described and illustrated in 12-page bulletin C–1100–B13 issued by Carbondale Div., Worthington Pump & Machinery Corp., Harrison, N. J.

PLANT SUPPLIES

Ball Bearings—Dimensions, capacities, tolerances, mounting fits and list prices of forged steel ball bearings are given in the 15th edition of the New Departure Handbook, published by New Departure, Division of General Motors Sales Corp., Bristol, Conn.

Belting—In the "Veelos Picturegraph", the advantages of Veelos adjustable V-belt drives are set forth by Manheim Manufacturing & Belting Co., Manheim, Pa.

Fittings and Valves—"Where To Use Valves, Drains and By-Passes" is the title of a booklet giving information on the construction and selection of all types of valves, and on the selection of drains and by-passes, published by Jenkins Bros., 80 White St., New York.

Packing and Gaskets—An illustrated catalog of packings and gaskets, containing service recommendations, a guide to packing selection and data on packing and gasket performance, has been issued as Form PK-12A, by Johns-Manville, 22 East 40th St., New York.

Protective Fences—A catalog of protective fences of the chain link type, of particular interest for the protection of industrial plant property during the emergency, has been issued as 40-page illustrated catalog No. 110 of Anchor Post Fence Co., Baltimore, Md.

Reduction Drives—"Wedgbelt" reduction drives, for providing driven speeds between 11 and 215 r.p.m., are described, with pulley and belt specifications, in Catalog W41, published by American Pulley Co., Philadelphia, Pa.

Rotary Pumps—Double helical gear rotary pumps for high efficiency handling of oils and other liquids are described with specifications in Bulletin W–483–B1, a 12-page illustrated publication of Worthington Pump & Machinery Corp., Harrison, N. J.

Steel Products—A stock list and buyer's guide for all sorts of steel products—bars, rounds, sheets, tubes, etc.—for 1941-1942 has been issued by Joseph T. Ryerson & Son, Inc., 16th and Rockwell Sts., Chicago.

Transmission Belts—Catalog Section 2150, entitled "Selection and Maintenance of Rubber Transmission Belts", giving information designed to answer questions concerning belt selection, has been issued by B. F. Goodrich Co., Akron, Ohio.

Unit Heaters—Detailed rating tables for use in selecting correct requirements for unit heating, together with installation data, are present in a 24-page illustrated bulletin published by Carrier Corp., Syracuse, N. Y.

Ventilating Equipment—Fan type ventilating equipment using Ventura fans, for industrial and commercial purposes, is described with specifications and application data in 40-page illustrated Bulletin No. B2529, published by American Blower Corp., 6000 Russell St., Detroit, Mich.

Washroom Facilities—Two useful bulletins entitled respectively "Scientific Washroom Service," and "Washroom Advisory Service," filled with useful information concerning the equipment and care of washrooms, have been issued by Scott Paper Co., Chester, Pa.

TRUCKING

Anniversary Publication—On the occasion of its 110th birthday, a handsome booklet giving the history of the company and entitled "Beginning Another Century" has been issued by Philadelphia Quartz Co., 121 S. 3rd St., Philadelphia, Pa.

Diesel Power—A booklet containing statements from users of diesel power in such industries as milling, dairy products and refrigeration has been issued as Form 6636 by Caterpillar Tractor Co., Peoria, Ill.

Display Cases—Refrigerated display cases for such food products as frozen foods, fish, dairy products and meats, are illustrated and described in 12-page bulletin CR–197 published by Carrier Corporation, Syracuse, N. Y.

Mold and Rope Preventive—How the salt, sodium diacetate, as used in Badex, kills rope and inhibits mold without adding any foreign flavor to bread, is told in a recent 4-page folder of Stein, Hall & Co., Inc., 285 Madison Ave., New York.

ARE YOU USING
RIBOFLAVIN ?

Investigate **SOLVAMIN**–*a Rich, Natural Source of This Vital Vitamin*

The importance of riboflavin for the maintenance of good health is now generally recognized. For an economical source of this essential vitamin, an ever-increasing number of food processors are turning to Solvamin.

Solvamin is rich in riboflavin, containing not less than 4500 micrograms per gram. Made from grain by a patented biological process, it also contains significant amounts of other members of the Vitamin B complex, particularly pantothenic acid.

The physical characteristics of Solvamin are such that it may be used in a variety of products. It is a finely ground powder, yellowish in color. It imparts no objectionable odor or taste to materials to which it is added. It can be blended readily with other dry materials. Since it dissolves easily in water, it may also be used in liquid foods and beverages. A request on your letterhead will bring a sample and detailed information.

COMMERCIAL SOLVENTS
Corporation

17 EAST 42nd STREET, NEW YORK, N. Y.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

PACKAGING

Comparing Foil with Other Wrappers for Cheese

SEVERAL wrapper foil materials which are cheaper than tin foil have been tested for suitability as wrapping materials for packaged cheese. Among them are Milprint coated Cellophane, Paracoat coated Cellophane, Pliofilm, Special Pliofilm, Sylvania sheet (moistureproof and special moistureproof) and General Felt C-15 as a coating on Cellophane and on glassine paper. These materials were examined and tested for flavor effects, adhesion and ease of removal, moisture retention, wrapper stability and mold resistance. No one of the wrappers was entirely satisfactory in all respects but two (Paracoat coated Cellophane and General Felt C-15) are at least equal to tin foil. With slight improvement in moisture resistance and coating adherence Milprint coated Cellophane would also be as good as tin foil or better. There was some molding at the seams with all the wrappers except Pliofilm, which has good properties but is too brittle when cold and does not adhere tightly enough to the cheese surface. It is to be expected that tin foil will be largely replaced by transparent wrappers for packaging processed cheese.

Digest from "Comparative Study of Packaging Materials for Processed Cheese," by Arthur B. Erekson, *Proceedings of the First Conference*, Institute of Food Technologists, 1940, p. 185.

New Method of Packaging Sliced Loaves

ACCORDING to U. S. Patent 2, 247, 401 (granted Gustav C. Papendick, of University City, Mo., on July 1, 1941), a new machine has been invented that employs certain features useful for handling and packaging sliced bread loaves.

It is often desired to have different kinds of bread, such as whole wheat, raisin and white bread in the same composite loaf. Some rather difficult and annoying problems are encountered in merchandising these composite package loaves, due to the fact that certain kinds of bread tend to absorb the flavor of other types of bread. White bread, for instance, when packaged compositely with whole-wheat bread, will absorb a considerable amount of the whole-wheat flavor. The machine wraps each of the individual fractions and then supplies an outer wrapper to the composite loaf.

FOOD TECHNOLOGY

Curing Vanilla

DEVELOPMENT of the vanilla aroma and flavor in vanilla beans is an empirical process dating back many generations. It involves stages, namely, wilting in the sun, sweating in blankets at 45 to 65 deg. C., air-drying to about a third of the initial water content and conditioning by storage in airtight chambers for six months or more. There are many variations of wilting, such as dipping in hot water, rubbing with alcohol or scratching with a needle. Chemical study of the process shows that the successive treatments increase carbon dioxide production in the beans. Freezing has the opposite effect. Oxidation is also part of the process, vanilla beans being rich in peroxidase, but oxidation does not necessarily lead to evolution of carbon dioxide from the tissues. Even after the cure is completed the beans still contain a complex peroxidase system of phenol, peroxide and enzyme. From the chemical relations involved in curing it seems probable that vanillin is an intermediate product in the development of aroma and that oxidation of vanillin is part of the process.

Digest from "The Curing of Vanilla," by A. K. Balls and Francisca E. Arana, *Industrial and Engineering Chemistry*, Vol. 33, 1073, 1941.

Acetaldehyde in Red Wines

AUTOXIDATION of red wines is complex because several oxygen-sensitive components are present. They include tannins, anthocyanins, sulphur dioxide, metal salts and alcohol. Acetaldehyde is formed, either by direct or induced oxidation of alcohol, but it does not accumulate unless oxidation proceeds at least as rapidly as the subsequent reduction of iron (or other metal) salts serving as oxygen carriers.

Tests with two California red wines (a Sonoma claret and a Solano Carignane) showed that the rate at which acetaldehyde forms and disappears varies greatly in different wines. The study was made with the special object of correlating changes in aldehyde content with the tannin content and color of the wine. It was found that sulphur dioxide protects acetaldehyde in wine, probably by forming a compound which does not react as readily as does the free aldehyde. Peroxide oxygen rapidly increases the aldehyde content of wine with little change in tannin content, but atmospheric oxygen oxidizes more of the tannin and forms aldehyde less rapidly. There is some evidence that color changes in red wines are due to fixation of aldehyde by the pigment rather than direct oxidation of the pigment. Hence fixation of aldehyde by a wine may be an index of its color stability.

Digest from "Role of Acetaldehyde in Red Wines," by M. A. Joslyn and C. L. Comar, *Industrial and Engineering Chemistry*, Vol. 33, 919, 1941.

Methyl Bromide Retention In Foods

FUMIGATION of foods with methyl bromide sometimes increases the bromine content of the product. In order to learn more about the presence or absence of health hazards in foods which retain bromine, several products have been fumigated under extreme conditions and analyzed for bromine retention.

Wheat berry and germ, flour, corn meal, milk powder, cheese, nuts, apricots, raisins and cabbage were tested. In general the fumigant is removed by simple evaporation, but some foods retain methyl bromide to a certain extent. Fatty foods such as nuts and cheese are foremost in this respect, with cereals and dried fruits following. Volatile residues do not present a commercial problem since methyl bromide evaporates rapidly.

Fixation of methyl bromide in some sort of combination is the chief problem, especially in fatty foods. Thus, walnut meats retained 18.4 percent of the initial bromine content after one hour. Information is needed as to

whether or not there is a health hazard in such retention of bromine.

Digest from "Bromide Residues in Foodstuffs," by Edwin P. Laug, *Industrial and Engineering Chemistry*, Vol. 33, 803, 1941.

VITAMINS

Fish Liver and Body Oils

THE vitamin potency of fish oils cannot be reliably estimated from the physical or chemical constants of the oil. Tests of 39 body and liver oil samples, chiefly from halibut, swordfish, tuna, mackerel, perch, pike, whiting, turbot, dogfish, shark, ray, eel, sardine, menhaden and herring, showed no significant and consistent relations. There was some indication of a relation between content of unsaponifiable matter and vitamin A potency in mackerel and sword fish liver oils, but the relation was not consistent. In density, refraction, saponifictation behavior, iodine number and acid number there was no evidence of a relation which might aid in estimating vitamin potency.

Swordfish liver oil was richest in vitamin A (maximum 328,000 U.S.P. XI units per gram) and vitamin E (maximum Hilger vitameter E value 164.00). Tuna liver oil was richest in vitamin D (maximum 70,000 U.S.P. XI units per gram) with swordfish liver oil ranking second (maximum 25,000 units). Halibut liver oil ranked high, but not highest, in all three vitamins.

Digest from "Fish Liver and Body Oils," by Arthur D. Holmes, Francis Tripp and G. H. Satterfield, *Industrial and Engineering Chemistry*, Vol. 33, 944, 1941.

Vitamin C in Sauerkraut

STORED sauerkraut may either lose or retain nearly all its original vitamin C, according to packing and storage conditions. Tests show that good vitamin C conservation in packing is a long step toward stability in storage. Washing the fermented kraut before packing is particularly destructive to its vitamin C content. Thus, a sample containing 26.7 mg.-percent fell to 23.9 when pressed and to 10.4 mg.-percent vitamin C when washed. Distribution of the vitamin between solids and liquor is approximately equal (25 to 30 mg.-percent in each). Hence discarding the liquid portion of sauerkraut means a substantial loss of vitamin C.

Taking 50 mg. as the average daily vitamin C requirement for adults, over a third of the investigated samples rated high (about 5 oz. fulfilling the daily requirement) and about three-quarters rated good (10 oz. daily fulfilling the requirement).

Digest from "Vitamin C in Sauer Kraut and its Changes in Storage," by Bozidar Vajic, *Zeitschrift für Vitaminforschung*, Vol. 11, 29, 1941. (Published in Switzerland).

MEAT

Pork Improves Corned Beef

A NEW method of making corned beef permits the use of any desired cut of beef, however lean, and pork fat.

The preferred method is to take the beef and form it into rolls which are then tightly covered with pork fat, caul fat being satisfactory. Into the tied pork fat covered rolls is injected a pickling agent. Then the rolls are submerged in a quantity of the same pickle until thoroughly cured. The action of the pickling agent upon the combination of pork and beef increases the flavor of the corned beef, which is not dry and does not have a tallowy flavor.

After curing, the rolls are subjected to a dry heat to brown the exterior pork fat. Water is then added and the product thoroughly cooked by boiling.

Digest from U. S. Patent 2,247,425, granted to Beverly E. Williams, Chicago, Ill., on July 1, 1941.

FROZEN FOODS

Foods Suitable for Freezing

MOST FRUITS produced commercially in southern states are suitable for freezing, but pears and bunch grapes are not recommended. Treatment with an anti-browning agent is helpful for apples, peaches and other fruits which darken when exposed to air.

Many vegetables are unsuitable for preservation by freezing because of losses (sometimes intensified by blanching) in freshness or crispness. This is true of celery, cress, cucumbers, endive, lettuce, green onions, parsley, radishes, green peppers, sliced tomatoes, cantaloupes and watermelons. Other vegetables such as artichokes, cabbage, onions, hot peppers, potatoes, sweet potatoes, pumpkins and rutabagas are readily preserved without freezing. But many vegetables are entirely suitable for freezing, e.g., asparagus, beets, broccoli, carrots, cauliflower, rhubarb, eggplant, pimento and spinach.

Frozen juice can be successfully produced from many fruits, but vegetable

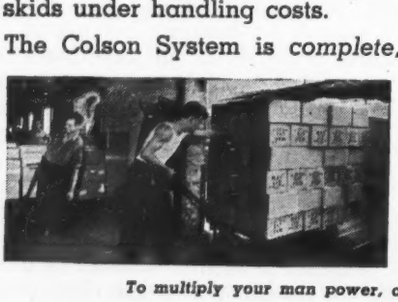
with a low-cost

COLSON LIFT JACK SYSTEM

When man power *must* be multiplied and fast-increasing production calls for greatest efficiency—the Colson Lift Jack System puts skids under handling costs.

The Colson System is *complete*, eliminating extra pick-up, extra set-down, extra handling.

The Colson System is *simple*—a platform with wheels on one end, and a two-wheeled jack that engages the front of the platform converting it into a sturdy, easy-to-roll-truck.



The Colson System can be installed with a *small* investment. A hundred dollars will buy several platforms and a lift jack. Many users report that their investment was returned in less than a year in actual savings in handling costs alone.

To multiply your man power, ask us for more complete information

THE COLSON CORPORATION
ELYRIA, OHIO
Offices and Agencies in Principal Cities
CASTERS • INDUSTRIAL TRUCKS AND PLATFORMS • LIFT JACK SYSTEMS
Colson

juices in general suffer too much loss of flavor in the necessary inactivation of enzymes by heat. Tomato and rhubarb juices, the only vegetable juices classified as "acid," are exceptions. Any commercially successful method of enzyme inactivation without injury to flavor would make many vegetable juices available for freezing.

Meats and fish can be frozen, but only high-grade products justify the cost. Among dairy products, sweet cream retains its flavor when frozen but whole milk does not. Some varieties of cheese can be held at the desired stage of ripeness by freezing. Eggs for baking should have the whites and yolks mixed, or if yolks are frozen separately 2 percent of glycerol should be added. Freezing is an excellent method of preserving eggs for large scale use, as in baking.

Digest from "Foods Suitable for Freezing Preservation," by J. G. Woodroof, Georgia Experiment Station *Bulletin* No. 212, 1941.

ENGINEERING

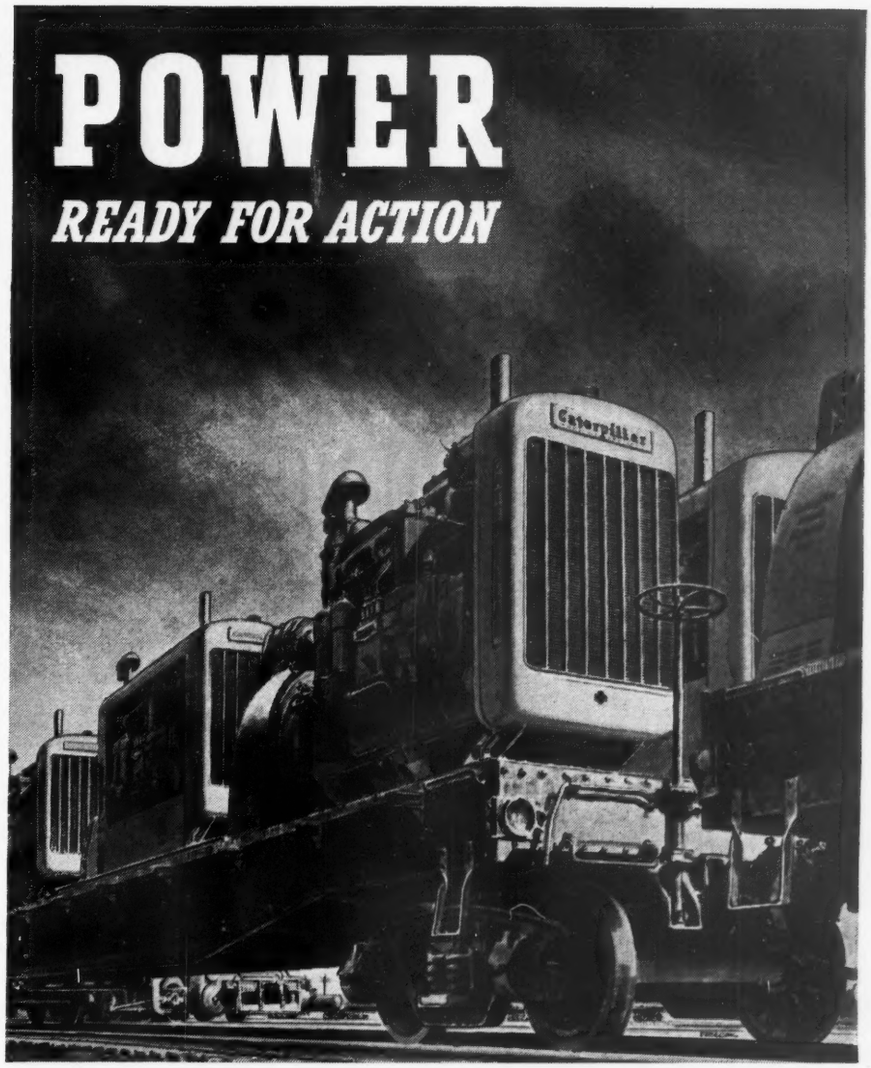
Compressed Air Replaces Dusting Flour

ACCORDING to U. S. Patent 2,245,284 (granted June 10, 1941, to Wilbur Lockwood of Indianapolis, Ind.) a new method is employed whereby dough is prevented from sticking to the surface of a dough machine through the use of compressed air. The principle employed is to dry the surfaces of the machine with which the dough comes in contact by subjecting these surfaces to the air, thereby preventing the dough from sticking.

This method eliminates the use of flour, which had been used previously for preventing dough from sticking to the surface of dough machines.

Electrical Refrigeration Equipment

AUTOMATIC CONTROL has been so successfully applied to small and medium-scale refrigeration, quick freezing and frozen storage that it is being extended to the more complicated requirements of electrical equipment for large-scale production and storage. Thermostats may be placed in the vaporizer, the liquid refrigerant or the storage room. Each type of control has its own problems and standards of accuracy and sensitivity, but for vaporizer control there is an alternative in that a "pressurestat" may be used instead of a thermostat. This is because there is a direct pressure-temperature relation in the vaporizer.



WHEN this nation rolled up its sleeves for the gigantic task of defense, one of its first needs was *power*. Camps, air fields, shipyards and munitions plants had to be built at full speed—many of them in remote places. Mines, quarries, oil wells and sawmills had to rush peak production of basic materials. And all these defense efforts depended on *power*. They had to have power in compact form—power that could be moved *anywhere* in a hurry—power that was ready to go to work and *stay* at work, regardless of geography or weather.

They got it without delay—because "Caterpillar" Diesel Engines and Electric Sets were built for just that kind of service. They drive clanking shovels, draglines, dredges, cranes; mighty air-compressors that run rock drills and jack hammers. They pump water and oil; power yard locomotives, and all manner of mill, factory and other industrial machinery. They furnish current for lights that turn night into day on around-the-clock operation.

Built by the world's largest manufacturer of Diesel engines, and backed by the most complete and readily available replacement-parts and service facilities of their kind, "Caterpillar" Diesels are widely chosen by power users and leading builders of engine-driven machinery. Their sturdiness, dependability and long life have been proved in thousands of installations. Their fuel system and fuel economy are outstanding Diesel-engine developments. Their adaptability for varied defense-industry uses is being proved every day.

CATERPILLAR TRACTOR CO., PEORIA, ILL.

CATERPILLAR
REG. U.S. PAT. OFF.
DIESEL ENGINES AND ELECTRIC SETS

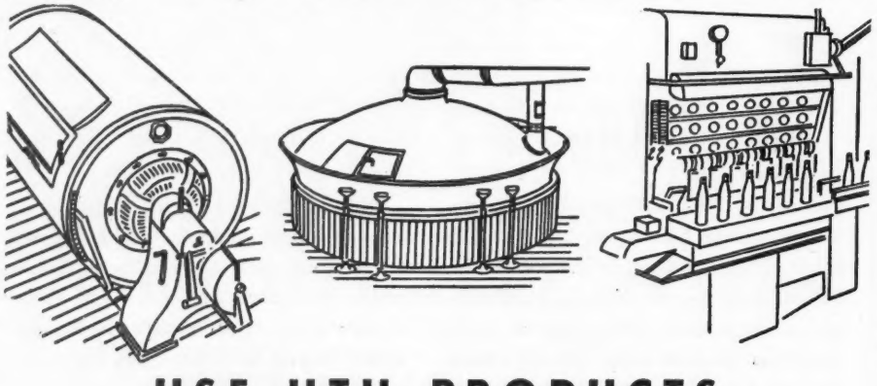
DON'T *Sabotage* YOUR PROFITS!

CUT SPOILAGE LOSSES...PROTECT QUALITY
use HTH PRODUCTS!

● In food plants of every kind bacterial contamination often does a thorough job of sabotaging profits — causing substantial dollars and cents losses due to resultant off-flavors and lowered quality of finished products. But these losses may be prevented by means of positive bacteria control established through the use of HTH Products.

HTH Products (HTH, HTH-15, Lo-Bax) are chlorine sterilizers in convenient powder form, always *full* strength and dependable in action. Added to water, they quickly make fast-killing hypochlorite solutions of the desired strengths for flushing, wiping or spraying all surfaces with which food products come in contact. Being in concentrated form, HTH Products are so economical to use, their positive germ-killing action can be applied throughout the entire plant.

Let HTH Products get to work in *your* plant—help prevent spoilage losses—protect the purity of your finished products. Send today for literature and full information.



USE HTH PRODUCTS

1. In churns, help prevent off-flavors and lowered butter quality caused by bacterial contamination.

2. In breweries—for sterilization of utensils, pipe lines, filtermass, fermenters, etc.

3. In bottling plants—a made-to-order job for HTH Products. Aids in preventing molds, yeasts and other microorganisms that cause spoilage.

HTH PRODUCTS

THE MATHIESON ALKALI WORKS INC. 60 E. 42ND ST., NEW YORK, N. Y.

HTH PRODUCTS (HTH, HTH-15 and LO-BAX)...NUFOS...DRY ICE...CARBONIC GAS...CAUSTIC SODA ...AMMONIA, ANHYDROUS and AQUA...SODA ASH...BICARBONATE OF SODA...LIQUID CHLORINE... BLEACHING POWDER...PH-PLUS...SYNTHETIC SALT CAKE...SODIUM CHLORITE PRODUCTS

A single refrigeration unit may serve two or more cold rooms even if the storage conditions differ. Each room may have its own thermostatic control. The Heckermann sharp freezer operates with a continuous conveyor on which the material is exposed to a high-speed air current (10 meters per second) at minus 40 deg. F. It uses more power for a like effect than does the plate-type (direct-contact) sharp freezer, but is continuous in operation and more versatile in size and shape of units to be handled.

Digest from "Electrical Methods in Food Storage," by T. E. Schmidt, *Elektrotechnische Zeitschrift*, Vol. 62, 26, 1941 (Published in Germany).

FATS & OILS

Continuous Refining Of Fatty Oils

PARTICULARLY useful in refining vegetable oils and other oils that present unusual difficulties in refining, a new continuous process has been developed in which a more fluid soap stock is obtained than in the practice of processes heretofore employed. The stock may be discharged with less trouble from the centrifugal apparatus that is used to separate the soap stock from the refined oil. This feature is particularly advantageous in the treatment of oils which produce, upon refining, a relatively hard and nonfluid soap stock, such as coconut oil.

The process is very adaptable for refining fatty oils derived from such sources as cottonseed oil, soybean oil, palm oil, peanut oil, corn oil, coconut oil, etc.

Digest from U. S. Patent 2,245,846 (granted Arthur U. Ayres of Chestnut Hill, Pa., on June 17, 1941).

DAIRY PRODUCTS

Coli in Ice Cream Mix

It is well known that *Esch. coli*, an organism whose survival is often regarded as proof of improper pasteurization, is more easily destroyed in milk than in ice cream mix. This is one reason why ice cream mixes are pasteurized at higher temperatures than those used for milk. In seeking to find why this should be so it was proved that neither sugar nor gelatine protected *Esch. coli*, but that the usual concentrations of locust bean gum or sodium alginate used as stabilizers did protect it. A pasteurization temperature of 155

deg. F. appears to be satisfactory even when these stabilizers are used.

Digest from "The Effect of Pasteurization on *Esch. Coli* in Milk and Ice Cream Mix," by Charles Paley and M. L. Isaacs, *Journal of Dairy Science*, Vol. 24, 421, 1941.

Rancidity Reproduced In Cheddar Cheese

RANCID and other less well defined flavors have been reproduced in cheddar cheese by the addition of commercial lipase to cheese milk.

A higher flavor score was obtained in cheese to which lipase was added when higher amounts of pepsin or rennet, or both, were used in its manufacture than in corresponding cheese where smaller amounts of proteolytic enzymes were added. An additional function has been attributed to the rennet enzymes.

Digest from "Effect of Photeolysis on Lipase 'Induced Rancidity in Cheddar Cheese," by I. Hlynka, E. G. Hood and C. A. Gibson, *Journal of Dairy Science*, Vol. 24, 561-565, 1941.

MISCELLANEOUS

Minerals in Nutrition

EIGHT separate studies undertaken by several departments at the Massachusetts State College were planned to demonstrate, in several ways, the possible significance of minerals in such disabling diseases as arthritis and arteriosclerosis (hardening of the arteries). Numerous analyses of fruits, vegetables and cattle feeds are given to show the maximum and average variations in composition. Individual samples of our common foods vary so widely in iron, manganese, calcium, iodine and copper content that it is unreliable to use average values for these minerals. In general, the available supply of minerals in the soil seems to be a more limiting factor than selective absorption in the mineral intake of plants. Differences in soil composition may cause marked differences in content of iodine, calcium, manganese, iron, fluorine and certain minor elements.

Kelp, which is extremely high in mineral content, proved of little value in treatment of vitamin B_1, C or D deficiencies in animals. Similarly, kelp fed in addition to cholesterol to rabbits aggravated the resultant hardening of the arteries. However, when kelp is fed to cows, there is a resulting increase in the iodine content of the milk. The milk is not less bactericidal than that drawn from cows not receiving kelp. Neither is the iodine present in the milk of greater nutritional value than ordinary potassium iodide. In general, the addition of small amounts of organic iodine to milk increased slightly the action of the milk enzymes; inorganic iodine seemed to either inhibit the enzyme action or to have no action at all.

There was no experimental evidence, using the white rat, that iodine administered with milk had any direct action on the intestinal flora, such as *Escherichia coli* and anaerobes. There was no diminution in intestinal putrefaction as a result of adding iodine to the rat's diet. Iodine added directly to fresh cow's milk had little effect on the bacterial flora until the concentration approached 300 parts per million—sufficient to produce serious off-flavors in the milk. Pasteurization of milk using added iodine was deemed impracticable. Considered as a unit, the several investigations reported in this bulletin show that our present-day information on food minerals is far from complete and that the influence of common and rare mineral elements on the animal body in health and in disease requires much study in the future.

Digest from "Minerals in Nutrition," by J. E. Fuller, W. S. Ritchie, W. B. Esselen, C. R. Fellers, H. S. Mitchell and others, *Bulletin* 374, Massachusetts Agricultural Experiment Station, Amherst, Mass., 40 pp., 1940.

Photochemical Oxidation Of Fats

IRRADIATION tests with corn and cottonseed oils and with lard and butter oil indicate that light rays become more active in promoting oxidation and rancidity as their wavelength increases from the red end to the blue end of the spectrum. Light absorption does not vary in the same way, being nearly constant for each oil in the yellow, orange and red regions. Only lard showed more than 5 percent absorption of these colors, and irradiation with yellow, orange or red light caused relatively little peroxide formation in the fat. With wavelengths shorter than that of yellow light, a regular increase in absorption with decreasing wavelength sets in, keeping pace with the increasing chemical activity of the shorter wavelengths.

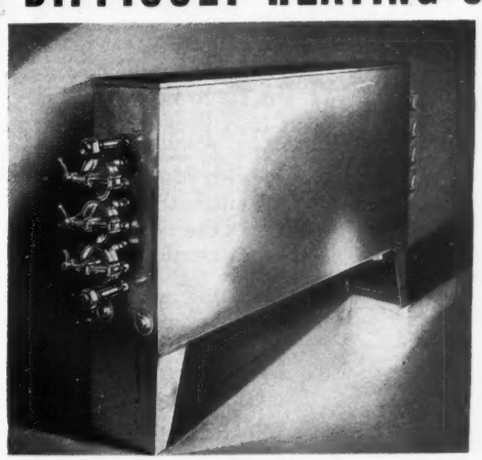
Some oils are more sensitive to these changes than others. Rate of oxidation depends on intensity of the irradiation rather than on the wavelength of the light.

Digest from "Promoting the Oxidation of Fats and Oil," by George R. Greenbank and George E. Holm, *Industrial and Engineering Chemistry*, Vol. 33, 1058, 1941.

CHESTER

TANK-TYPE PREHEATER

FOR DIFFICULT HEATING JOBS



Used as a preheater before separators or for almost any special heating operation. The Chester Tank-Type Preheater takes up little floor space and is constructed to sell at a reasonable price. It is equipped with either tinned copper and bronze or all stainless steel product systems. Capacities 2000 to 11,000 pounds per hour (40° to 135° with water at 150°).

Write for New Bulletin

CHESTER DAIRY SUPPLY COMPANY

9th and Hyatt Sts. ***Chester Builds for Permanence*** **Chester, Pa.**

BOOKS

Help on Cereal Storage

INSECT PESTS OF STORED GRAIN AND GRAIN PRODUCTS. By Richard T. Cotton. Published by Burgess Publishing Co., Minneapolis, Minn. 1941. 242 pages; 6x9 in.; paper with plastic open-page binding. Price $3.

Stimulated by foreign war interference with international trade and by domestic national defense preparations, the storage of cereal foodstuffs is likely to increase both in quantity and in length of storage periods.

To help combat deterioration in quality of these foodstuffs, knowledge relative to the identification, habits and methods of controlling insects commonly found in stored cereals is essential. A timely compilation of that information is to be had in this well-illustrated and indexed reference manual. Also included are tables of data, graphs and references to literature covering all types of fumigants, dosages required and vital behavior of the insects under various conditions of storage and of treatment for their destruction.

As Senior Entomologist of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, the author presents the contents of the 11 chapters comprising this book as the most complete, yet thoroughly practical, treatise on insect infestation, its eradication and its prevention yet published.

Although written particularly for the grain storing and flour milling and handling industries, much of the contents will be helpful to all food manufacturers and processors whose raw materials or finished products are subject to insect infestation.

Data for Freezers

FOODS SUITABLE FOR FREEZING PRESERVATION – FREEZING LOCKER PLANTS. By J. G. Woodroof. Published as Bulletin 212 by Georgia Experiment Station, Experiment, Ga., 1941. 24 pages; 6x9 in.; paper. Free, with restricted circulation.

Compressed between the covers of this bulletin is a wealth of practical information for those who freeze foods. Though prepared primarily for locker plant operators, much of the material is equally useful to commercial freezers.

As the title indicates, the bulletin names fruits, vegetable juices, meats and dairy products which are suitable for freezing, giving varieties in the case of fruits, vegetables and juices. There is a section on freezing eggs, and one on locker storage plants which covers the types of service, location of the plant, layout, food preparation room, meat aging room, freezer locker room and management. Sections on storing frozen foods and serving them conclude the bulletin.

Purifying with Carbon

ACTIVE CARBON – THE MODERN PURIFIER. By John W. Hassler. Published by Industrial Chemical Sales Division, West Virginia Pulp and Paper Co., 230 Park Ave., New York, N. Y. 1941. 159 pages; 6⅛x9⅜ in.; cloth. Free.

Now in its fourth edition, this book presents technical and engineering information on the so-called decolorizing type of active carbon. It has use in the food industries because it discusses the application of this material to the purification of sugars and sirups, fats and oils, other food products, water and waste, and its use in air conditioning. Flow diagrams are given for cane sugar refining, beet sugar refining, glucose refining, cottonseed oil refining. And a typical layout is given for the use of carbon on fats.

IT'S WISER TO PROTECT SHINY SURFACES
IT PAYS to be careful about the cleaner used and thus avoid replacing expensive equipment. You can clean thoroughly yet safely with Metso*. And that is due to the unique silica (SiO_2) content in Metso which balances the cleaning action and protects against chemical attack.
Metso Balanced Cleaners give quick action in emulsifying fats, oils and grease, and rinse them away completely. There's no re-settling of removed dirt on the cleaned surface. Investigate Metso now before the shine wears off your equipment.
*A special cleaner in liquid form is available for tin and aluminum. Details on request.
PHILADELPHIA QUARTZ COMPANY
EST. 1831
General Offices: 125 S. Third St., Phila., Pa. Chicago Sales Office: 205 W. Wacker Drive. Stocks in 60 cities. Sold in Canada by National Silicates Ltd., Toronto.
METSO CLEANERS
METSO

Noncorrosive Sterilizers

NEW GROUP OF STERILIZING AGENTS FOR THE FOOD INDUSTRIES AND A TREATMENT FOR CHRONIC MASTITIS. By F. M. Scales and Muriel Kemp. Published as Association Bulletin No. 19 by International Association of Milk Dealers, 309 W. Jackson Blvd., Chicago. 1941. 30 pages 5½x8½ in.; paper. Free. Limited number of copies obtainable from authors at Sheffield Farms Co., Inc., 1055 Webster Ave., New York, N. Y.

Considerable data on the germicidal power of synthetic organic detergents are given by the authors in this reprint of a paper presented at the IAMD convention. These synthetic agents are stable, have desirable wetting action and are not corrosive.

Latest on Biochemistry

ANNUAL REVIEW OF BIOCHEMISTRY. Vol. X. Edited by James Murray Luck. Published by Annual Reviews, Inc., Stanford University, P. O., Calif. 692 pages; 6½x9 in.; cloth. Price $5.

Each year this review contains a number of important scientific papers on various biochemical subjects. Twenty-four are in the current volume. Among these are some of particular interest to technologists in the food industries.

PATENTS

Sausages Extruded Into Casings Under High Pressure Through Valve Having Rotatable Plug Connecting Inlet and Outlet Which is Opened and Closed by Motor-driven Shaft—Norman C. Gross, Milwaukee, Wis. No. 2,250,707. July 29, 1941.

Wort Aerated and Cooled While Flowing in Relatively Thin Film Over Surface of Conical Shape Against the Under Surface of which is Directed Current of Filtered and Conditioned Air; Air and Wort Meeting at Perimeter of Conical Surface—Robert C. Schock, New Rochelle, N. Y., to Schock, Gusmer & Co., Inc., Hoboken, N. J. No. 2,250,777. July 29, 1941.

Chewing Gum Base Made From Polybasic Acid Modified Polyhydric Alcohol Ester of Hydrogenated Rosin—Jacob M. Schantz, to Hercules Powder Co., Wilmington, Del. No. 2,251,070. July 29, 1941.

Chocolate Confections Raised and Lowered Through Vertical Plane by Means of Series of Flight Levels to Obtain Prolonged Traveling and Cooling Time in Limited Floor Space—Fritz Nestmann, to J. M. Lehmann, Dresden, Germany. No. 2,251,197. July 29, 1941.

Protein Composition Made by Chemical Reaction Between Skim Milk Solids and Animal Blood Hemoglobin—Lloyd A. Hall, to Griffith Laboratories, Inc., Chicago, Ill. No. 2,251,334. August 5, 1941.

Shortening Stabilized by the Addition and Incorporation of Monobasic Sugar Acid—Donald P. Grettie, to Industrial Patents Corp., Chicago, Ill. No. 2,251,485. August 5, 1941.

Salt-free Matted or Cheddared Curd Held at 50 to 60 Deg. F. for Three to Ten Days Preliminary to Mixing With Cheese and Heat-treating to Make Pasteurized Product—Clinton H. Parsons, to Industrial Patents Corp., Chicago, Ill. No. 2,251,496. August 5, 1941.

Liquid Egg Meats Subjected to Two-stage Filtering Operation; Second Stage Under Greater-than-atmospheric Pressure—Frank B. Lomax, Chicago, Ill. No. 2,251,684. August 5, 1941.

Edible Oil and Rice Flour Mixed With the Addition of Water and Heated to Form Cheese Plasticizing Agent—Henry H. Doering, Chicago, Ill. No. 2,252,170. Aug. 12, 1941.

Plastic Confectionary Material Forced Through Form Shaping Dies by Mechanical Means—Edward W. Bridge, Philadelphia, Pa. No. 2,252,248. Aug. 12, 1941.

Baked Cracker Sheets Broken Into Desired Packaging Units Along Scored Markings by Mechanical Means—Vaughn F. Carus, to Baker Perkins Co., Inc., Saginaw, Mich. Nos. 2,252,362 and 2,252,363. Aug. 12, 1941.

Synthetic Method for Making Vitamin B_1—Zoltán Földi and Arpád Gerecs, Budapest, Hungary. No. 2,252,921. Aug. 19, 1941.

Husks Removed From Ears of Corn While Moving Over Apertured Plates Counter to Movement of Husker Teeth Projecting Through Plate Apertures—Charles E. Kerr, Hoopeston, Ill., to Food Machinery Corp., San Jose, Calif. No. 2,252,933. Aug. 19, 1941.

Fruit Acids Separated From Concentrated Water Solution Containing Metallic Ions by Treatment With Carbonaceous Hydrogen Zeolite Preliminary to Crystallization—Gordon Manley Cole, Corona, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,253,061. Aug. 19, 1941.

Asparagus Formed Into Predetermined-size Bunches, Held During Cutting Off of Butt Ends and Packed into Cans by Mechanical Means Without Crushing Tips—Theodore C. Massicott, Westminister, Md., to Sinclair-Scott Co., Baltimore, Md. No. 2,253,133. Aug. 12, 1941.

Pectin Jelly Made by Reaction Between Alkaline Earth Metal and Pectin-containing Water Solution Sufficiently Alkaline to Produce Final Product With pH Above 7 Without Converting Pectin to Pectate—Nathan M. Mnookin, Kansas City, Mo., to Speas Co. No. 2,253,389. Aug. 19, 1941.

Hydraulic Cocoa Press Containing Series of Pots Equipped With Filling Pipe Lines Having Telescopic Parts and Capable of Being Moved in Direction of Central Axis of Press to Speed up Emptying and Filling Operations—Karl Leimer, Dresden-Zschieren, Germany. No. 2,253,437. Aug. 19, 1941.

Sausage Stuffer Fitted With Screening Unit of Frusto-Conical Shape Fitted Into Valve and Nozzle Assembly—William Kent Tomlinson to Globe Co., Chicago, Ill. No. 2,253,465. Aug. 19, 1941.

Vegetable Oils Containing Free Fatty Acids Treated With Sodium Ferrocyanide Preliminary to Neutralization of Residual Acid With Alkali—Raymond E. Daly and James F. Walsh, Chicago, Ill., to American Maize-Products Co. No. 2,253,480. Aug. 19, 1941.

Proteins Recovered From Soy Beans by Dissolving Into Alkaline Solution at Relatively High pH, Lowering pH Value to About 7 or 8 by Addition of Oil Fatty Acids and Obtaining Final Viscosity Lower Than Would Have Been Obtained if Final pH Value Had Been Used at Beginning—Albert J. Heberer, Maywood, Ill., to Glidden Co., Cleveland, Ohio. No. 2,253,517. Aug. 26, 1941.

Egg Whites Heated at Between 70 to 80 Deg. F. Without Fermentation to Reduce Viscosity and Liberate Natural CO_2 Content Preparatory to Adjusting pH Value to 7.0 for Liquefying by Natural Enzymes, Acidifying With Edible Acid to Give pH Value of 5.0 Preparatory to Filtering and Drying of Resultant Thin Egg White Mass—Louis E. Hess, San Antonio, Tex., to Joe Lowe Corp., New York, N. Y. No 2,253,518. Aug. 26, 1941.

Bottled Beverages Inspected on Continuous Operating Production Line by Automatic Cell-Photo-Tube Control—James H. Reynolds, Baltimore, Md., to Coca-Cola Co., Wilmington, Del. No. 2,253,581. Aug. 26, 1941.

Dessert Powder Made to Consist of 25 to 75 Parts Sugar, 6 to 10 Parts Gelatine, 0.1 to 0.8 Parts Citric Acid, 0.0 to 0.5 Parts Salt and Desired Flavor and Color to Make Mixture Capable of Dissolving 55 Grams in ¼ Pint of Hot Water and Gelling Upon Addition of ¾ Pint of Cold Whole Milk Without Formation of Curds or Skin—Chester H. Epstein, Highland Park, and Nathan R. Gotthofer, Grayslake, Ill., to Grayslake Gelatin Co., Grayslake, Ill. No. 2,253,614. Aug. 26, 1941.

Bread Making Put on Automatic Continuous Production Basis—James T. Duffy, Jr., to Read Machinery Co., Inc., New York, N. Y. No. 2,253,770. Aug. 26, 1941.

Fluid Confectionery Material Deposited Into Starch Tray Forms in Such Manner That Plungers of Depositing Mechanism Are Inoperative When No Tray is Under Depositor—William Melody, to E. J. Brach & Sons, Chicago, Ill. No. 2,253,938. Aug. 26, 1941.

Bread Loaves Fed at Controlled Rate of Speed to Reciprocating Slicing Blades Operating Through Vertical Plane—William E. Bettendorf, Davenport, Iowa, to Micro-Westco, Inc., Bettendorf, Iowa. No. 2,254,099. Aug. 26, 1941.

Animal and Vegetable Oils Refined for Removal of Mucilaginous Matter and Other Impurities by Centrifuging as Delivered From Treating Chamber at Temperature Which Retards Forming of Emulsion—Benjamin Clayton, Houston, Tex., to Refining, Inc., Reno, Nev. No. 2,254,101. Aug. 26, 1941.

Juice-cell Group of Citrus Fruit Separated From Fruit "Rag" by Mechanical Device—Ralph Polk, Sr., Miami, and Ralph Polk, Jr., Haines City, Fla., to Polk Development Co., Tampa, Fla. No. 2,254,187. Aug. 26, 1941.

Milk Waste Material Treated With Bentonite for Recovery of Protein and Fat Solids—Ernest E. Pittman and Robert Roger Bottoms to Girdler Corp., Louisville, Ky. No. 2,254,241. Sept. 2, 1941.

LUSTRACAST by COOPER

(Electrolytic Polish)

Stainless Steel CASTINGS Fittings • Valves

Improve the quality of your stainless products with COOPER "Lustracast" Stainless Steel Castings, Fittings, Valves.

The exclusive "Lustracast" process gives COOPER products a brighter, CLEANER, more passive surface which in turn increases the practical utility, life and saleability of your products.

Investigate these definitely BETTER Stainless Castings, Fittings, Valves.

The COOPER Alloy Foundry Co.

Elizabeth, N. J.

Fuller **STEELGRIPT BRUSHES**

TO manufacturers and processors of Food: Wherever you use Brushes, consider Fuller STEELGRIPT'S enduring construction with its greater density of brush material, securely gripped in rigid, rust resisting metal backings.

Conveying equipment, wrapping and packaging, bottling and labeling machinery operate more efficiently with these sturdy, long wearing Brushes.

Also try our standard line of Floor Brushes, Dusters and the famous FULLER FIBER Broom.

The FULLER BRUSH Company
INDUSTRIAL DIVISION — DEPT. 8C
3592 MAIN STREET · HARTFORD, CONN

Speed Production . . . Cut Waste . . . . . .

Temperature variations in food processing may result in production tie-ups; in excessive heating or cooling costs; in spoilage; complaints or "rejects." All of these restrict net profits and hamper business growth.

•

The simple, inexpensive solution to these problems is to use MOTOCO Indicating and Recording Thermometers at all points in the plant where temperature is important . . . let them show you where waste and loss are occurring.

•

MOTOCO Dial-type Thermometers are precision-built for accuracy . . . their solid construction assures long and economical service. Invest in MOTOCO Thermometers and profit from increased efficiency . . . NOW. Send a letter or post card today, requesting MOTOCO folder which gives full information. We shall be glad to submit recommendations for your particular requirements. Moto Meter Gauge & Equipment Division, The Electric Auto-Lite Company, Chrysler Bldg., New York, N. Y.

•

MOTOCO Indicating Thermometers have rigid stem for direct mounting or capillary tubing for remote reading. Priced from

$20

MOTOCO Recording Thermometers are priced from

$31

√ **FOR BAKING TEMPERATURE**
√ **FOR SMOKEHOUSE TEMPERATURE**
√ **FOR STORAGE TEMPERATURE**
√ **FOR DRYING ROOM TEMPERATURE**
√ **FOR BOILER TEMPERATURE**

MOTOCO

INDUSTRIAL THERMOMETERS

Sugar-containing Liquids Heat Treated and Held at Controlled Temperature Levels Preliminary to and During Sugar Recovery Centrifuging—Charles A. Olcott, West Milford, N. J. Nos. 2,254,386; 2,254,387; 2,254,388; 2,254,389; and 2,254,390. Sept. 2, 1941.

Foods Quick Frozen in Unit Consisting of Casing and Plurality of Space and Refrigerating Elements; Walls Made From Highly Extensible Resilient Material Capable of Being Formed Into Desired Shapes at Low Temperatures—Wladimir M. Zarotschenzeff, Palisades, N. J., to National Frosted Foods, Inc., New York, N. Y. No. 2,254,406. Sept. 2, 1941.

Viscosity Controlled by Mechanical Device—Alfred L. Kronquest, Syracuse, N. Y., to Continental Can Co., New York, N. Y. No. 2,254,575. Sept. 2, 1941.

Fruit Heat Treated in Retort for Removal of Skin With Partial Cooking and Wilting Preparatory to Packaging in Sealed Containers Where Processed for Absorption of Sirup and Return to Substantially Normal Condition — William Perlman, Syracuse, N. Y., to Continental Can Co., Inc., New York, N. Y. No. 2,254,580. Sept. 2, 1941.

Whole Citrus Fruit Given Increased Varietal Color by Treatment With Oil-soluble, Water-insoluble Dye—Ralph H. Higby, Ontario, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,255,025. Sept. 2, 1941.

Peanut Butter Given Semi-solid Consistency by Incorporation of Tasteless and Odorless Petroleum Wax Resembling Peanut Butter in Color as Filler and Binder—Henry Weisgurt and Dale R. van Horn, Lincoln, Neb., van Horn rights to Weisgurt. No. 2,255,032. Sept. 2, 1941.

Canadian Patents

Protein Extracted From Ground, Low-fat-content Peanuts by Controlled Addition of SO_2 Into Alkaline Water Suspension With pH Between 8.0 and 8.5—Andrew McLean, Saltcoats, Ayreshire, Scotland, to Imperial Chemical Industries Ltd., London, England. No. 398,296. July 29, 1941.

Milk Cooled and Aerated in Milk Cans By Use of Insertable Unit Which Causes Circulation of Cooling Water Around Corrugated Pipes Through Which the Milk is Made to Flow—Peter R. Yost, Goshen, Ind. No. 398,391. Aug. 5, 1941.

Cheese Made by Neutralizing Pasteurized Milk With CaO or MgO Preliminary to Adding Starter to Form Curd and Cooking, Cutting, Cheddaring, Milling, Salting and Pressing of Curd—Ernest D. Fear, to De-Raef Corp., Kansas City, Mo. No. 398,423. Aug. 5, 1941.

Milk Homogenized and Inoculated With Lactic Acid-producing Starter After Pasteurization and CaO or MgO Neutralization —Ernest D. Fear to De-Raef Corp., Kansas City, Mo. No. 398,424. Aug. 5, 1941.

Lactic Acid-producing Starter Prepared by Neutralizing Pasteurized Milk With CaO or MgO and Inoculating With Streptococcus lactis or Lactobacillus bulgaricus—Ernest D. Fear, to De-Raef Corp., Kansas City, Mo. No. 398,425. Aug. 5, 1941.

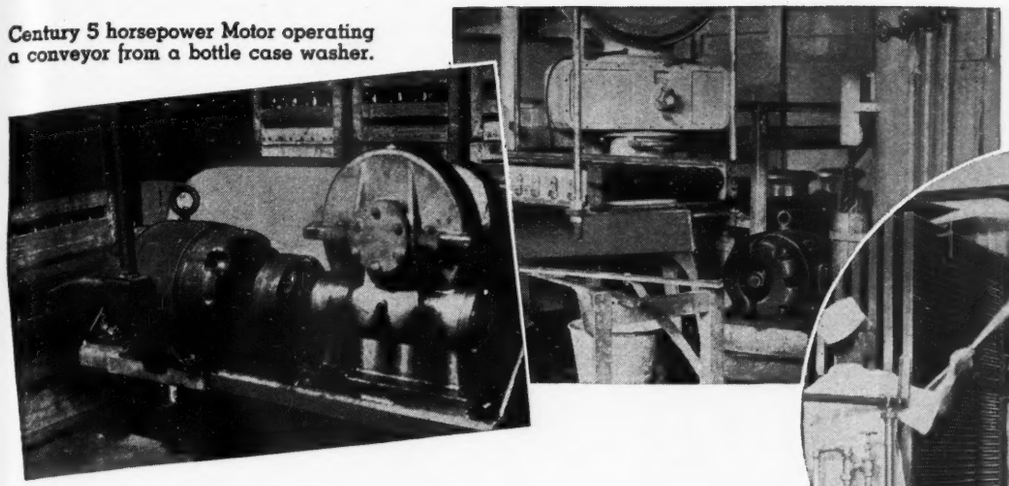
Starch Paste Made in Mixing Chamber in Which Aqueous Starch Suspension is Subjected to Steam From Ejector Preliminary to Transfer to Collecting Chamber—Philip D. Coppock, Wirral, Cheshire, England, to Distillers Co., Ltd., Edinburgh, Scotland. No. 398,428. Aug. 5, 1941.

Beverages Mechanically Mixed During Rythmic Turning of Filled Bottles Alternately Into Inverted and Upright Positions on Oscillating Support—Jas. Kantor, to Liquid Carbonic Corp., Chicago, Ill. No. 396,606. Aug. 12, 1941.

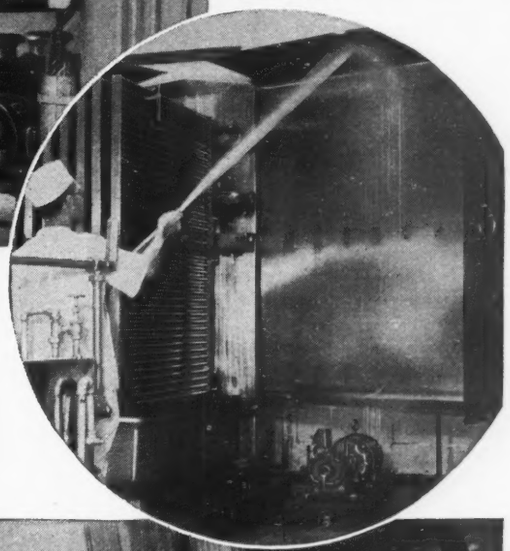
Apples Graded and Sized on Belt Conveyor Passing Under Series of Rotatable Sizing Disks Spaced Successively Closer to Belt as Discharge End is Approached—Norman M. Bartlett, Beamsville, Ont. No. 398,773. Aug. 26, 1941.

Cow's Milk Modified for Infant Feeding by Adding Ascorbic Acid After Adjusting Composition to Approximately That of Human Milk, Sealing in Containers in Absence of Air and Light and Sterilizing—Peder K. Henriksen, to Canned Cream and Milk Co., Aktieselskab, Odense, Denmark. No. 398,919. Aug. 26, 1941.

Century 5 horsepower Motor operating a conveyor from a bottle case washer.



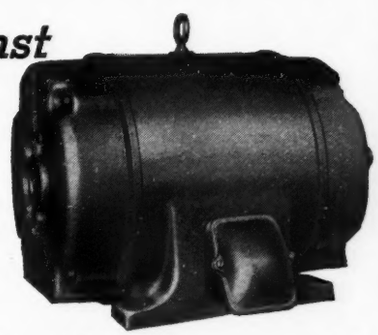
(At left) Moisture laden atmosphere—Century 10 h.p. motor operating a milk can washer. (Below) This Splash Proof 3 h.p. motor gets a thorough washdown.

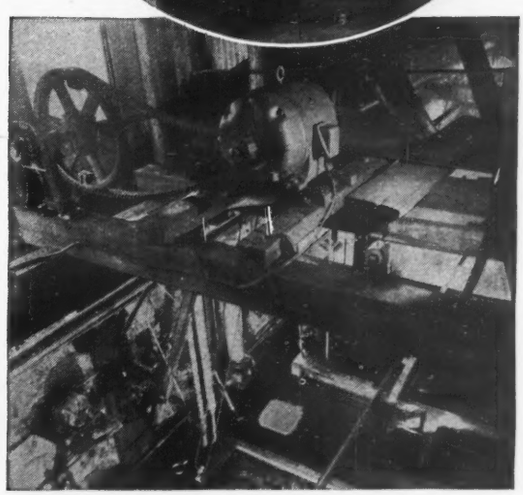


Avoid Production Interruptions with Century Splash Proof Motors

Protection Against

- Liquids
- Solids
- Dirt
- Fumes





Century Splash Proof 5 horsepower motor operates while surrounded by chemical fumes from a dye vat.

Century Splash Proof Motors are deliberately built for installations where they may be subjected to dripping or splashing water or washing down with a hose, whether located indoors or outdoors.

They may be had with special insulation for locations where the air is charged with greater than normal amounts of acids or alkali.

They are also widely used in installations where wet and dry solids are regularly falling upon them.

Splash Proof Motors are only one of many Century Motor types—fractional and integral horsepower—from which the Century Motor Specialist can select the right motor for the particular application in your plant. Call in *your* nearest Century Motor Specialist today—his consultation service costs you nothing.

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Mo.
Offices and Stock Points in Principal Cities

Century MOTORS

One of the Largest Exclusive Motor Manufacturers in the World

AN EXTRA HARVEST of new customer preference is now being reaped by those companies who took the lead in vitamin restoration of processed foods.

Soon vitamin-restored foods will be the rule rather than the exception.

Shape your plans now, before slipping sales curves reveal a vitamin-conscious public turning away from your product for some other claiming definite vitamin values.

Get full facts and latest cost figures on pure synthetic vitamins B_1, B_2, C and E from a company which is one of the world's largest producers of synthetic vitamins, and whose able experts can offer counsel on marketing and promotional plans in addition to necessary technical information.

Address inquiries to our Vitamin Division

HOFFMANN-LA ROCHE, INC.

NUTLEY • NEW JERSEY

World Famous for Fine Pharmaceutical Chemicals

FORMULAS FOR FOODS

FORMULA NO. 228

Fondant

Fondant	20 lb.
Agar (very finely ground)	1 oz.
Shortening	12 oz.

Melt 4 lb. of the fondant and heat to the boiling point. Sift the agar into the boiling fondant while stirring vigorously. Boil for one minute. Add shortening. Place the remaining fondant (16 lb.) in a mixing bowl and add the above hot mixture while mixing slowly. The temperature of the stabilized fondant should be 100 to 105 deg. F. Use immediately or keep warm until used.

Formula presented by C. W. Lantz at annual meeting of American Society of Bakery Engineers, Chicago, March 14, 1940.

FORMULA NO. 229

Curry Powder, English Type

Tumeric	8 lb.
Coriander	6 lb.
Cardamon	3 lb.
Cumin	3 lb.
Fenugreek	3 lb.
Clove	1 lb.
White pepper	1 lb.
Cayenne	4 oz.

All ingredients should be dry. Grind each ingredient separately to fine powder. Then mix thoroughly. Pass Through a fine-mesh sieve. Package in an airtight container to avoid volatilization of essential oils and flavors.

FORMULA NO. 230

Ginger Marmalade

Drain 40 lb. of preserved ginger and chop fine. Bring 2 gal. of water to boiling point in a steam pan and add the chopped ginger. Again bring to boiling point. Add 60 lb. of sugar and stir well. Raise the temperature gradually to 200 deg. F. Then add 6 lb. of liquid pectin; stir well and boil to 222½ deg. F. Pour the product into a cooler and allow to cool down to 210 deg. F., stirring occasionally. Fill into jars and allow to become cold before capping.

Part of the sugar may be replaced by the sirup from the preserved ginger. For this purpose each gallon of the sirup may be taken as the equivalent of 8 lb. of sugar. One can also incorporate a little ginger essence, and also a little coloring matter such as caramel.

See also General Directions, Formula No. 205.

Formula from H. B. Cronshaw, London, England.

Republication rights reserved.

FORMULA NO. 231

Lime Marmalade

Immerse the ripe fruit (say 28 lb.) in hot water. Cut in half and remove the dummies. Then cut the peel as for ordinary marmalade and boil the chips for about an hour until quite soft. Strain off and discard the water. Place the dummies in a steam-pan with 4 gal. of water and simmer until the pips are easily removed. Pass through a sieve or pulping machine. Then mix the chips with the pulp. Add 2 gal. of water and 56 lb. of sugar. Boil to 222½ deg. F. See also General Instructions, Formula No. 205.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 232

Butterscotch (Plain Liquid)

Water	6 gal.
Sugar	240 lb.
Butter	15 lb.
Vinegar (cider, 4.5 percent acid)	28 fl. oz.
Corn sirup	240 lb.
Corn starch	12 lb.

Water, sugar and corn sirup are put into kettle and brought to a boil. Add the vinegar and then the corn starch which has been made into a paste with some cold water. While adding corn starch, do not allow boiling to stop. Heat to 222 deg. F. and then add butter. When butter is melted put through homogenizer at 3,000 lb. pressure.

Formula from David Algie.

FORMULA NO. 233

Sugar-Water Icing

Water	4½ lb.
Stabilizer (fine ground)	1 oz.
Shortening	1 lb.
Icing sugar	20 lb.

Heat the water to boiling. Sift stabilizer into the water while stirring vigorously. Boil for two minutes. Add shortening to hot stabilized water and allow to melt. Pour the above hot mixture into the sugar and mix until smooth. The temperature of the finished mixture should be about 100 deg. F. The amount of stabilizer used will depend upon the quality. For a very thin icing increase the amount of water or decrease the stabilizer, or apply at a temperature of 120 deg. F.

Formula presented by C. W. Lantz at annual meeting of American Society of Bakery Engineers, Chicago, March 14, 1940.

FORMULA NO. 234

Maple Fudge

Sirup Batch

Concentrated maple sirup (2½ fold)	4 lb.
Granulated sugar	16 lb.
Corn sirup	8 lb.
Hard coconut butter (92 deg. m.p.)	4 lb.
40 percent cream	3 qt.
Salt	3 oz.

Fondant Batch

Regular stock fondant	20 lb.
Nougat cream or equivalent frappe	4 oz.

(Note: For the "old-fashioned" or grainy variety, add 6 lb. of powdered 4X sugar to the creaming batch.)

Mix all the ingredients of the sirup batch together in the kettle with sufficient added water to complete the solution of the sugar, and cook to 245 deg. F. Then melt in the fondant and nougat cream, adding the powdered sugar last. Finish with chopped walnuts or pecans as desired and pour out on slab.

Formula from Quebec Maple Sugar Producers.

FORMULA NO. 235

Beef Loaf

Beef, fresh	20 lb.
Bread crumbs	5 lb.
Onions	2 lb.
Flour	1 lb.
Beef stock	2½ qt.
Bacon	5 lb.
Salt	1 oz.
Pepper	¼ oz.

Grind the meat and onions in a grinder. Soak the bread crumbs in water and then squeeze out excess water. Mix the meat, bread crumbs and onions together. Add salt and pepper. Make into loaves about 4 in. wide by 3 in. high by 12 in. long. Then make a batter of the flour and beef stock,

"We are immensely pleased with this mill"

"We are immensely pleased with this mill. It is certainly a beautiful piece of mechanism, operates very smoothly, and turns out a splendid job. Because of the uniformity of granulation and the fact that it packs much more closely than the product of our previous mill, we are finding it possible to reduce the size of our glass jars and vacuum tins which will mean quite a saving."

(NAME ON REQUEST)

GUMP COFFEE
GRANULIZERS

invariably give their users *real* satisfaction. For, they deliver cool, uniform, full-flavored grinds with remarkable efficiency and economy. Their positive lever grind control makes possible exact duplication of grinds. And their versatility, when equipped with a "find grind" section enables them to produce all grinds from ultra-fine to coarse steel cut with *equal coolness and uniformity.* Obviously these precision-built machines are highly regarded, for the total daily capacity of all Granulizers now in use is considerably over 6,000,000 pounds! Investigate and specify a GUMP (All Roll) GRANULIZER and you'll know you're getting the best.

B. F. Gump Co

Established 1872

454 So. Clinton Street Chicago, Illinois

rubbing this over the loaves. Place in a hot oven (450 to 500 deg. F.) for about 10 minutes, or long enough to produce a crisp, brown crust, then reduce heat to about 200 to 250 deg. F. and bake for one hour. A slice of bacon may be placed on the top of each loaf to improve the flavor.

In place of 1 lb. of bread crumbs, 1 lb. of tapioca may be used to bind and furnish a moist loaf that will not crumble when sliced.

Formula from Quartermaster General, U. S. Army. Training Manual No. 2100-152.

FORMULA NO. 236

Raisin Spice Cut Squares

Granulated sugar	4½ lb.
Shortening (preferably part butter)	2¼ lb.
Cinnamon	1½ oz.
Ginger	¾ oz.
Salt	3¼ oz.
Eggs (whole)	2¼ lb.
Ripe-banana powder (with dry milk solids)	2 lb. Optional
Extra water	2 lb. Optional
Milk (liquid basis)	5½ lb.
Molasses (open-kettle high-quality)	5 lb.
Invert sugar, standardized	1 lb.
Baking powder	6¼ oz.
Flour	10 lb.
Raisins	10 lb.

Directions

Cream the sugar, shortening and spices. While continuing the creaming, gradually add the eggs. Meanwhile dissolve the ripe-banana powder containing dry milk solids and water in the milk. Then add the molasses and sugar. Separately blend the baking powder and flour. Add the blend and solution to the creamed mixture and mix smooth. Just before finishing the mixing, incorporate the raisins.

Formula from Nulomoline Co.

FORMULA NO. 237

Caramel Pop Corn

No. 10 soft sugar (brown sugar)	3 lb.
43 deg. Baumé corn sirup	2 lb.
Coconut or corn oil	2 oz.
Water to dissolve	

Cook slowly to a good "crack"—about 280 deg. F. This quantity of sirup is sufficient to coat 4 gal. of popped corn. Pour the hot sirup over the popped corn and stir rapidly until distributed. Then add 2 oz. of coconut or corn oil and continue stirring until cool. This oil is used to prevent the popped corn from "balling." It is highly desirable that the coconut or corn oil contain 1 percent of lecithin, based upon oil weight. This will do a much better job than the straight oil.

A revolving pan is suitable, but small batches can be made in a regular open pan, using a wooden paddle to stir the sirup and distribute the oil.

If soft sugar (brown sugar) is not used, it will require 3 lb. of corn sirup and 2 lb. of white granulated sugar. Otherwise the formula is the same.

Formula from American Sugar Refining Co.

FORMULA NO. 238

Banana Cake

Cake flour	5 lb.
Light brown sugar	5 lb.
Salt	2 oz.
Skim milk powder	5 oz.
Bicarbonate of soda	1 oz.
Shortening (70 deg. F.)	2 lb. 8 oz.
Water	2 lb. 4 oz.

Mixing Directions

Sift the dry ingredients together at least once. Then place all of the ingredients in a machine bowl. Use paddle and mix until smooth, or about 3 minutes on low speed or 2 minutes on second speed. Scrape sides of bowl frequently. Then take:

Crushed ripe bananas	1 lb. 12 oz.
Banana flavor	1 oz.
Whole eggs	1 lb. 12 oz.

Mix bananas, flavoring and eggs

Because they mix with water to form very finely divided particles, and eventually go into solution when the product is sufficiently dilute

D & O
SPICEOLATE FLAVORS

offer distinct advantage over oils and dry spices in almost any food product, whether in liquid or dry form.

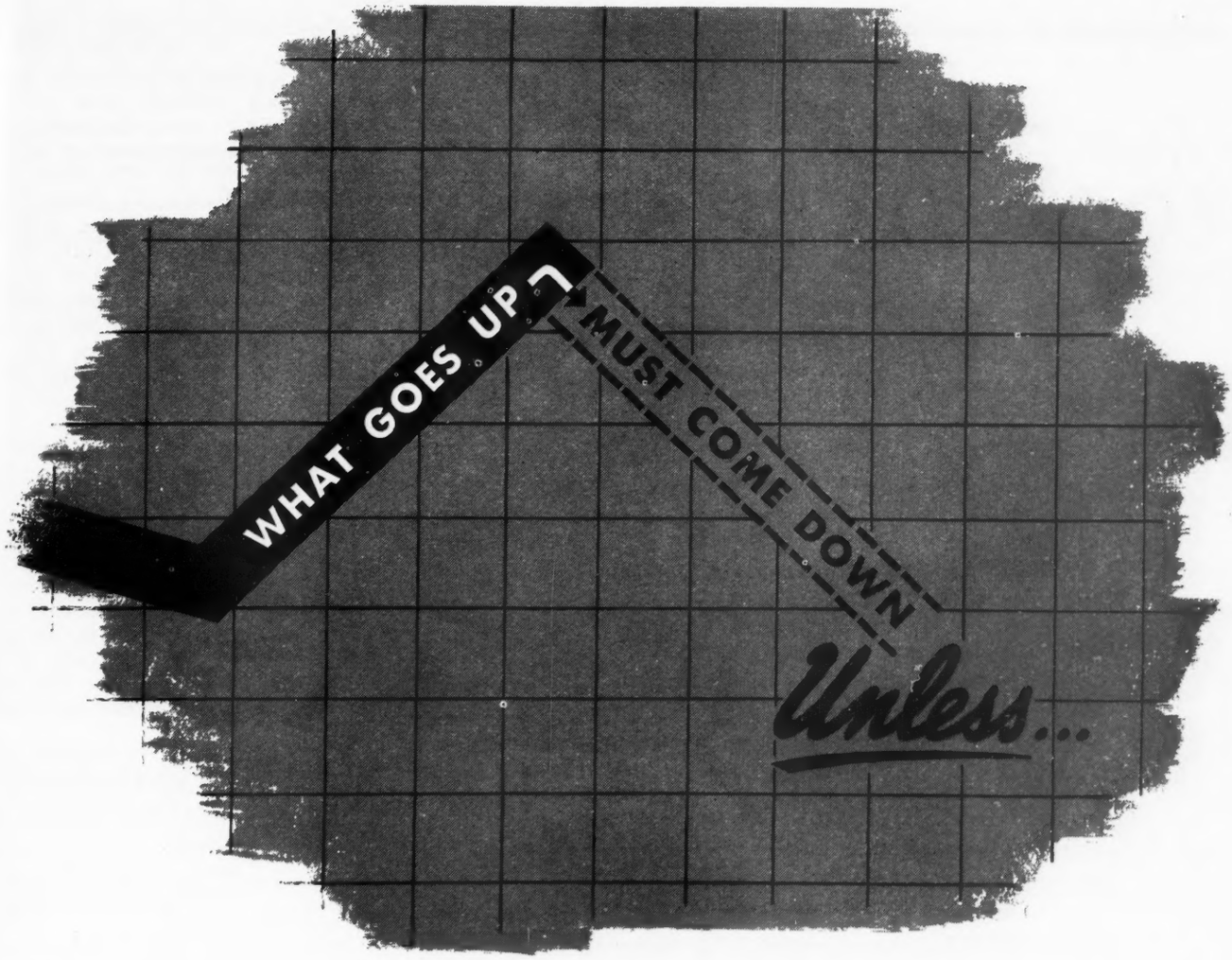
Complete directions to interested customers

DODGE & OLCOTT COMPANY

180 Varick Street • New York, N. Y.

Boston • Chicago • Philadelphia
St. Louis • Los Angeles
Plant and Laboratories—Bayonne, N. J.

D&O ESTABLISHED IN 1796



***WORLD'S LARGEST**

Vanillin Monsanto was created eleven years ago after many years of exhaustive research and development. Today, Monsanto is the world's largest manufacturer of vanillin, thus assuring the food and confectionery industries of a dependable domestic source of supply of this highly important flavoring at stable, economical prices!

SALES of a food product may zoom after a high pressure sales-advertising-merchandising drive for new customers... but it takes consistant quality and purity in the product itself to *hold* customers once you win them and *keep* sales curves up once you start them climbing.

That's why successful food manufacturers watch the quality and purity of every item that goes into their products with painstaking and uncompromising thoroughness... and why more of them specify Vanillin Monsanto in their formulas than any other vanillin*!

Vanillin Monsanto is the standard of the food industry for purity, true aroma, and uniform flavoring strength. The materials that go into it are made within Monsanto's own plants, and every step in its manufacture is rigidly controlled.

When you specify Vanillin Monsanto, *you can be sure* of both consistent quality and purity. MONSANTO CHEMICAL COMPANY, St. Louis, U.S.A. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, London.

MONSANTO CHEMICALS
SERVING INDUSTRY WHICH SERVES MANKIND

LET'S GO! U.S.A. KEEP 'EM FLYING!

FOOD TECHNICIANS

recognize the outstanding merits of

MELOJEL

(the Specially Refined Corn Starch)

MELOJEL sets a new standard in *smoothness of texture* and *stability*. It enhances the appearance and improves the taste of food products in which it is used.

MELOJEL has been adopted by many leading manufacturers of

- **SALAD DRESSINGS**
- **PUDDING POWDERS**
- **BAKERY PRODUCTS**

and numerous other types of food products. MELOJEL costs you *no more than ordinary corn starch*. A sample, or any trial quantity on request.

NATIONAL STARCH PRODUCTS Inc.

818 GREENWICH STREET, NEW YORK

together thoroughly. Add these ingredients slowly to the above batter during 2 minutes, mixing on low speed. Continue mixing 1 minute more on low speed. Finish to smooth batter by mixing about 2 minutes more on second speed.

Use 8x2 in. layer pans. Grease pans with a compound of 1 lb. of shortening creamed with 8 oz. of cake flour. Use paper bottom liners. Use 13 oz. of batter per pan. Spread batter evenly. Bake for 25 to 28 min. at 330 deg. to 340 deg. F. Bake until done but do not over bake. Observe time and temperature very closely.

Production Suggestions

Best results are obtained when the finished batter has a temperature between 70 and 75 deg. F. The shortening should be 70 deg. F. Use fairly ripe bananas. Green or unripened bananas will not give desired flavor. Crush bananas thoroughly before adding to batter. The directions given apply to a 3-speed machine. On a 4-speed machine use second and third speeds.

Directions for Finishing

Make a banana flavored "fondant butter cream" by taking:

Fondant	10 lb.
Butter	2 lb.
Shortening	3 lb.
Banana flavor	2 oz.

Cream well on low speed 3 minutes, then 3 minutes on second speed. Then add slowly 10 oz. of whole eggs, and continue mixing on low speed for 5 minutes then on second speed for another 5 minutes. *Do not beat on high speed.* Butter and shortening should be 70 deg. F. in order to obtain the best results.

Next prepare a banana marinating solution by dissolving 2 oz. of fine granulated sugar and the juice of one lemon in 1 lb. of water.

Spread the above fondant butter cream about ⅛-in. deep over one cake layer. Dip banana slices (¼-in. thick) into marinating solution, drain, and place on butter cream to form a full layer.

Spread fondant butter cream over another cake layer and place this, butter cream down, over the bananas, thus putting the bananas between two layers of butter cream.

Cover the sides and top of cake with butter cream icing. Garnish sides of cake with toasted rice cut coconut or toasted shredded coconut. Slice bananas ⅛ in. thick, dip in marinating solution and place, overlapping, to form a border on top of cake.

Formula from General Foods Sales Co., Inc.